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FINAL REGULATORY EVALUATION, REGULATORY FLEXIBILITY DETERMINATION, INTERNATIONAL TRADE IMPACT ANALYSIS, AND UNFUNDED MANDATE REFORM ACT ASSESSMENT

FINAL RULE
PART 145 REVIEW: REPAIR STATIONS

**OFFICE OF AVIATION POLICY AND PLANS
OPERATIONS REGULATORY ANALYSIS BRANCH, APO-310
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EXECUTIVE SUMMARY

The Federal Aviation Administration (FAA) is updating and revising the regulations for part 145 repair stations. The final rule is necessary because many of the current repair station regulations do not reflect changes in repair station business practices, advancements in technology, and aircraft maintenance practices. The benefits and costs have been calculated for 13 years.

The estimated quantifiable safety benefits, being difficult to quantify, are calculated based on what the reduction in accidents needs to be in order to equate the discount costs to the discounted safety benefits. If the safety benefits are half of those discussed in the initial regulatory evaluation (6.9 total accidents will be avoided, preventing 2.2 fatalities, 1.7 serious injuries, and 2.7 minor injuries), then the quantifiable safety benefits of the final amendment will be approximately, $28.5 million in 2000 dollars discounted at 7 percent, over 13 years. On an annual basis (assuming that quantifiable benefits are only one-half of those estimated in the initial regulatory evaluation) an average of 3.4 total accidents will be avoided, preventing 1.1 fatalities, 0.8 serious injuries, and 1.4 minor injuries. The avoidance of 3.4 accidents will avert at a minimum the destruction of at least 2.4 general aviation aircraft and will avert the substantial damage of 0.7 general aviation aircraft. Property damage to other types of aircraft will also be averted.

The estimated net cost of compliance after subtracting cost savings with the final amendment will be $22.2 million (net of cost savings) in current dollars, discounted at 7 percent, over 13

years. The most costly requirement, section 145.161, Training Requirements, will result in repair stations incurring discounted costs of $30.5 million. The most cost-saving requirement, the Manufacturer's Service Manual, will result in repair stations saving between $22.8 and $45.5 million discounted.

The final rule is not expected to have a significant impact on international trade nor is it expected to have a significant impact on a substantial number of small firms.

1.0 BACKGROUND AND FINAL RULE

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic effect of regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effect of regulatory changes on international trade. The following analyses show that this final rule: (1) will generate benefits that justify the costs and is not "a significant regulatory action" as defined in the Executive Order; (2) is significant as defined in Department of Transportation's Regulatory Policies and Procedures; (3) will not have a significant impact on a substantial number of small entities; and (4) will not constitute a barrier to international trade.

The Federal Aviation Administration (FAA) is updating and revising the regulations for part 145 repair stations. The final rule will reorganize the repair station rules to reduce duplication of regulatory language, eliminate reference to obsolete technology, and revise the appropriate section references in parts 11, 91, 121, 135, and 145. The final rule also eliminates, where practicable, distinctions between repair stations based on geographical location.

The current repair station regulations are based primarily on concepts that were developed much earlier in the history of aviation. Very few substantive changes have been made to repair station rules since they were recodified in the Federal Aviation Regulations (27 FR 6662, July 13, 1962).

The FAA held several public meetings as part of this rulemaking action. More than 500 representatives of repair stations, airlines, unions, manufacturers, foreign governments, industry organizations, and individuals attended the meetings. In preparation for the meetings, the FAA identified several areas of the repair station rules for possible revision. The goal of these meetings was to gather enough factual information to determine what revisions should be made. As a result of the above, the FAA published Notice of Proposed Rulemaking No. 99-09 "Part 145 Review: Repair Stations" (64 FR 33142, June 21, 1999) that proposed to revise those areas identified during the public meetings and the FAA's review of related documents. The FAA received approximately 1800 comments from individual repair stations, associations representing repair stations and other-aviation-related entities, unions, aviation authorities, air carriers, manufacturers, members of congress and the National Transportation Safety Board.

This final rule updates and revises many provisions of part 145 for repair stations. This action is necessary because many of the current repair station regulations do not reflect changes in repair station business practices and aircraft maintenance procedures. The rule reorganizes the requirements applicable to repair stations to reduce duplication of regulatory language and eliminate obsolete information. For example, the FAA is reorganizing certain subparts and sections of the final rule for clarity, to provide more regulatory flexibility, and in some cases to lessen regulatory burdens. In addition, the rule establishes new definitions applicable to repair stations and updates requirements relative to repair station certification, housing facilities, equipment, material and data, personnel, and operations. The rule also eliminates, where practicable distinctions between repair stations based on geographical location. The final rule

does not adopt the proposed revised repair station ratings and quality assurance system; these proposals will be addressed in a subsequent notice of proposed rulemaking. The final rule will retain the current rating and class system.

2.0 RESPONSE TO PUBLIC COMMENTS ON THE COSTS AND BENEFITS OF THE PROPOSED RULE

The following is an analysis of the numerous comments concerning economic impacts from the notice of proposed rulemaking (NPRM) that revises part 145 of Title 14, Code of Federal Regulations. The comments are addressed on a section by section basis as they were proposed followed by comments on (1) paperwork burdens associated with the proposed changes to part 145; (2) contract maintenance; (3) issues that impact general aviation and/or smaller repair facilities only; and (4) costs associated with the transition of operations under the current rule to those under the proposed rule.

145.2 Certificate issued to a person in a country outside the United States; certificate issued to a person in a country with which the U.S. has a bilateral safety agreement.

Comment: Commenters stated that foreign repair stations would take away business and jobs from domestic repair stations and undermine aviation safety. This would happen because foreign repair stations would be regulated less stringently than facilities based in the U.S. and, therefore, would be able to provide cheap maintenance costs. To take advantage of this cost incentive, U.S. aircraft would be sent overseas for maintenance (496, 498, 499, 500, 501, 502, 524[1]).

[1] These numbers refer to the numbers assigned to the public comments received by DOT. Copies of these comments can be found on the Docket Management System's website at http://dms.dot.gov.

Response: For the reasons stated in the preamble to the final rule the FAA does not believe that the changes contained in the final rule would result in foreign repair stations being regulated less stringently. Therefore, the FAA believes that these comments are unfounded.

145.3 Definition of terms.

(a) Accountable manager

Comment: One commenter, a technician with a smaller certificated repair station, states that he is accountable for the completion of projects within the repair station. This commenter contends that in attempting to create the new position of accountable manager, the FAA will cause the commenter to incur cost increases due to hiring new employees and performing more paperwork. He estimates the costs would be from $36,000 to $40,000 per year (382).

Response: The FAA has revised the definition of accountable manager to clarify that the person in this position is responsible for and has authority over only repair station operations that are conducted under part 145. The FAA is not requiring that a new position be established.

(b) Actual work documents.

Comment: A commenter estimates the following costs to implement the proposed change regarding actual work documents. The minimum costs for the initial setup would be $352,720. This figure includes new computer hardware at a cost of $25,000; contract software development at a cost of $25,000, work record research and design for two technical writers to write 4,000 manuals at a cost of $129,920 ($1,624 x 80 weeks); and clerical/data entry at a cost of $172,800

(six data entry clerks x 360 x 80 weeks). The recurring costs will be $590,720 per year. This includes nine technicians at a cost $340,704 per year, two additional inspectors at a cost of $104,000 per year, and six clerical workers at a cost of $146,016 per year (392).

Response: This commenter believes that the definition for actual work documents implies that there is a cost to him. The requirement for maintaining adequate records is found in existing § 145.61, recordkeeping. The definition sections of the proposed rule do not imply any costs associated with actual work documents.

(j) Consortium

Comment: One of the stated goals of this rulemaking project was to establish and apply a uniform set of standards to repair stations and the conduct of their work. Establishment of a consortium seems to run counter to this thinking in that it fundamentally creates a different set of standards for repair stations associated with type certificate holders due to relief that can be granted to consortiums under the rule. This appears to have significant anti-competitive ramifications within the industry because economic advantage would appear to be granted to type certificate holders and manufacturers (380).

Response: The FAA has removed this definition from the final rule for the reasons discussed in the preamble.

145.7 Performance of maintenance, preventive maintenance, alterations, and required inspections for certificate holders under parts 121, 125, and 135; and for foreign air

carriers or foreign persons operating a U.S.-registered aircraft in common carriage under part 129.

Comment: Two commenters note that the proposed language of § 145.7(a)(1) and § 145.7(a)(2) implies that certificated repair stations must adopt completely an air carrier's requirements. They do not believe that this was the intent of the FAA and they request the administrator, specifically, to remove the words "as the part 121 certificate holder is required to comply" from § 145.7(a)(1) as well as the similar words in § 145.7(a)(2). One of these two commenters estimates that compliance with this section would cost a 200-person repair station an initial $450,000 to $500,000, with annual costs of $55,000 to $60,000 (300, 308).

Response: The FAA has moved this section to § 145.205. For the reasons discussed in the preamble, the FAA concludes that there will be no incremental cost impact.

145.51 Application for certificate.

Comment: With regard to § 145.51(a)(2), a commenter estimates that for approximately 500 line items at 3 hours per item at a rate of $35 per hour, it would cost $52,500 to compile a capability list. Two commenters state that to establish a listing by part number or other item number for larger complex repair stations would necessitate the generation of excessive paperwork and add a cost and administrative burdens for both the FAA and industry (76, 307, 308)

Response: The capability list is optional and is only for limited rated repair stations, and therefore the cost estimates described above are high. If a rated repair station elects to use capability lists, it may do so, but the burden is on the repair station to decide and to submit the

correct information to the certificate holding district office (CHDO). If the repair station elects not to use the capability list, then their certificate and operations specifications will be changed by the CHDO.

The capability lists provide many benefits to the limited rated repair stations. The capability list may relieve limited-rated repair stations of maintaining manuals, documents, and process specifications for an entire array of products when all they are doing is a few selected components of a type certificated product.

There would, however, be some initial costs to develop a capability list along with a self-evaluation. After this list and self-evaluation process have been created, then the only added cost would be when and if their capabilities change. They would then incur a cost saving by not having to maintain certain items in current form for articles they are not working on. For those who fear it will cost them thousands of dollars to develop a capability lists, the FAA believes that they would not be using a capability list anyway because they probably have a class rating. Again, the capability list would probably only be used for those limited-rated repair stations.

Comment: With regard to § 145.51(a)(4), two commenters note that the requirement of an organizational chart and a list of the names and titles of management and supervisory personnel is costly because frequent turnovers in personnel could result in having to update this chart on a monthly basis and the repair station could be shut down while waiting for FAA approval changes. One commenter estimated $350 per year and the other one $10,000 per day. Both

commenters recommend that this requirement be changed to an organizational chart by functional title only (76, 127).

Response: The organizational chart and the list of the names and titles of management and supervisory personnel are requirements of the application for a certificate, which is not a monthly requirement, but only a one-time, initial requirement. Repair stations are only required to provide this information at the time of the application for a repair station certificate so that CHDO can ascertain whether or not the personnel have the background, experience, and certificates required by Subpart D to hold their positions. If it is found that they do not have the background, experience, and certificates, the application will be rejected by the CHDO. §145.209 (a), the requirements for the repair station manual, also requires an organizational chart, but not by names--just positions so that the manual does not have to be revised every time personnel changes.

Additionally, under the existing rule (§ 145.43), many personnel records are already required. And, in the final rule, the rosters that are required by section § 145.209 must reflect changes within 5 business days, which relaxes the current requirements.

Comment: With regard to § 145.51(a)(6), which required repair stations (as part of the application) to provide a list of maintenance functions to be contracted out, a commenter estimates a cost of $7,000 (200 contractors x 1 hour per contractor x $35 per hour) to keep a list of those maintenance functions performed. Two other commenters state that they would require an additional half-time person. For the first commenter, the person would cost $25,000 per year,

plus office space, equipment, and furniture totaling $11,000. For the second commenter, the person would cost $26,000 per year, plus office space, equipment, and furniture totaling $10,500. Another commenter estimates $36,500 per year. Lastly, a commenter of a smaller repair station estimates that he or she would need to add one man month to cover administrative costs, or about $3,300. (76,127, 371, 372, 399)

Response: The FAA has adopted § 145.51 (a)(6) as proposed. A similar requirement for applicants to provide a list of maintenance functions to be performed by it under contract is found in the existing rule (§ 145.11(a)(3)), so there will be no cost impact.

145.57 Amendment to or transfer of certificate.

Comment: Several commenters requested the FAA to modify the proposed language in existing § 145.57(b), which states that "the privileges of a repair station certificate cannot be transferred if the repair station is sold, leased, or otherwise conveyed". The commenters wanted to be able to transfer their repair station certificate when selling, leasing, or otherwise conveying. Three commenters stated that the proposed language requires a recertification process, which would result in an unnecessary administrative cost burden to the FAA and industry, and would delay the conduct of business. Another commenter stated that the proposed regulation would destroy the company's market value and also would destroy the independent shareholders ownership equity as no buyer would be willing to place the full fair market value upon the purchase of a repair station. (308, 361, 385, 392)

Response: This is not a new requirement. It was required in the existing rule (§ 145.15(b)), so there will be no cost impact.

145.59 Ratings and classes.

Comment: The proposed rule revised the system on ratings and classes. Many commenters provided cost information on ratings and classes saying that they would incur significant cost increases.

Response: The FAA has withdrawn the proposed rating and class system and will address this issue in a subsequent rulemaking.

145.103 Facility and housing requirements.

Comment: Under § 145.103(a)(7), commenters claim that requiring a separate storage facility would be unnecessarily burdensome. In a back shop, an article may be disassembled and shelved pending second operation. This could require transporting that part to a separate storage facility, which would significantly impact cost. (123, 230)

Response: § 145.103(a)(7) is not a new requirement. It was required in the existing rule (§145.35(d)), which stated that the applicant must provide suitable storage facilities used exclusively for storing standard parts, spare parts, and raw materials, and separated from shop and working space.

Comment: A commenter claims that it is unrealistic for a smaller repair station with ten or fewer employees operating with a just-in time inventory system to be required to construct a storage facility to house minimal amounts of inventory. This represents an undue financial burden to our company. (399)

Response: This is not a new requirement. It was required in the existing rule (§ 145.35(d)), so there will be no cost impact.

Comment: Under § 145.103(b)(1), commenters contend that they have a contract to provide maintenance on a DC3. However, the aircraft does not fit in their hangar, so they provide the service at the contractor's facility. If § 145.103(b)(1) remains, they would be forced to either build another hangar at a cost in excess of $1,000,000, or give up this contract (76).

Response: The current rule (see § 145.35(c)) states that the applicant must provide suitable assembly space in an enclosed structure where the largest amount of assembly work is done. The assembly space must be large enough for the largest item to be worked on. It is unclear from reading the comment how and why the repair station will not be able to continue his work as the provisions for working outside have not been deleted.

Comment: Commenters strongly support maintaining their ability to use permanent work docks as is the current practice industry wide (i.e., manufacturing, air carriers, repair stations). It would be a significant cost burden to the industry if their use were eliminated. It is estimated that the

cost to perform the work without docks could range from $5 to $50 million depending upon the structure selected (i.e., portable enclosure or permanent structure) (307, 308).

Response: The FAA will not eliminate the use of permanent work docks, so there will be no cost impact.

145.107 Satellite repair stations.

Comment: Several commenters oppose the proposal that a satellite repair station must prepare a repair station manual that is approved by the FAA certificate holding district office. Five of these commenters estimate that this requirement would cost them $1,028.64 per satellite facility per year ($977.73 for technical labor hours and some out of pocket costs plus $50.91 for staff labor hours) because they will be required to do an annual assessment of their satellites' repair station manuals. The other commenter estimates that this requirement would cost $30,678.40 (Consultant fees = $24,000 ($1200 per day x 20 days); FAA administrator and Quality manager review of the manual = $6,000; QC manager = $678.40 (20 hrs. x $33.92 per hour)).

Additionally, these commenters suggest that the district office for the parent repair station should issue the certificate for any satellite repair station. The reason is that different FAA Offices interpret the FAA regulations differently, therefore, centralization of certificate management for a repair station and its satellite facilities is needed. (147, 327, 328, 395, 401, 455)

Response: A satellite repair station may use the managing repair station's manual if it is applicable to the satellite operation. In many cases when the operations of the managing and

satellite repair stations are not identical the satellite repair station will use portions of the managing repair station's manual. The FAA notes that the manuals could be combined with specific procedures set apart for the satellite repair station. The FAA notes that the manual must be acceptable to the manager rather than approved, as proposed.

145.111 Equipment and material requirements

Comment: Spending money to keep rarely used tools would cause an undue economic burden. Another commenter suggests permitting the leasing of these special tools. (76, 179, 260, 361, 387)

Response: The FAA has revised the proposed language to permit a repair station to meet the equipment requirement by having a contractual arrangement acceptable to the Administrator which ensures that the equipment will be available when the work is performed. Such arrangements may include lease agreements and rental agreements. This will accommodate those repair stations that do not plan on purchasing expensive equipment that may not be used regularly. The FAA will review the contractual arrangement during the certification process particularly with respect to the applicant's ability to obtain the equipment when the relevant work is performed. However, this provision does not relieve the applicant from having the equipment in place and available for inspection at the time of certification.

Comment: The commenter states that he is a smaller FAR 145 repair station operating with a total of 30 employees with estimated annual sales of $3 million dollars. This commenter argues that the FAA is requiring him to have autoclave equipment at an initial cost of about $715,000,

which includes training, equipment and facility space allocation. The commenter also stated that an autoclave (which is a requirement in proposed Appendix A) is not used in the maintenance and preventive maintenance of composite aircraft—an autoclave is primarily used in the construction of aircraft and components.

Response: The FAA has decided for many reasons (see preamble) to remove Appendix A from the FARs. Therefore, the final rule contains no equipment requirements such as those listed in Appendix A. Consequently, this commenter will incur no additional costs associated with revisions to Appendix A.

145.151 Personnel requirements.

Comment: Under proposed § 145.151(a)(3), these commenters state that tests would have to be developed for every job function and records maintained of who is qualified for each task, which would create an undue economic burden. Currently, repair stations depend on the skills and judgment of supervisory and management personnel to evaluate and assign tasks to uncertificated employees as workloads and schedules require. Other commenters from smaller and larger repair stations oppose this section because the NPRM has not addressed the cost, fees, or record keeping requirements of the proposal (361, 387).

Response: After reviewing these comments and after having reviewed the language in existing §145.39, the FAA has decided to retain the language in existing §145.39(a) which requires officials to determine the abilities of the station's noncertificated employees performing

maintenance operations on the basis of practical tests or employment records. There is consequently no cost impact, regardless of the size of the repair station.

Comment: Commenter states that the NPRM did not address the unequal burden placed on smaller repair stations, other than airframe and powerplant repair stations, that rely almost exclusively on noncertificated personnel. (387)

Response: With the data available, the FAA calculated the economic impact on smaller repair stations for the NPRM. The FAA has since recalculated the economic impact on small entities based on comments received in the public docket. The new results are shown in the regulatory flexibility analysis for this final rule.

145.153 Supervisory and inspection personnel requirements.

Comment: The commenter contends that under § 145.153(d) the training requirements are overly restrictive. If taken to its logical conclusion, all management personnel would have to accompany employees to their training seminars to qualify. The average cost of this training would be $2,000 per week, which does not include expenses such as travel, salary, food or lodging, and when lost revenue would be included, costs could reach over $7,000 per week. (281)

Response: The requirements in proposed § 145.153(d) are not new—they can be found in the existing rule (§ 145.39(d)). The difference is that § 145.153(d) deals specifically with

supervisors, whereas § 145.39(d) deals with individuals that are "directly in charge". Similarly, in the final rule, no new requirements are imposed, so there will be no cost impact.

145.157 Records of management, supervisory, and inspection personnel (Final 145.161)

Comment: Under § 145.157(a)(4), the commenter estimates a cost of $1,190 to keep a summary of the employment of each individual (32 mechanic-hours and 2 administrative-hours) (76).

Response: This is not a new requirement. It was required in the existing rule (§ 145.43(b)), so there will be no cost impact.

145.159 Training requirements (Final 145.163)

Several commenters provided cost estimates for the training requirements. Most of them provided a cost model—with labor hours and wage rates—for initial training and another one for recurrent training.

Labor Hours

Commenters either divided the hours into technical and clerical or provided overall hours. See Table 1 below for a comparison between the hours estimated in the regulatory evaluation and in the comments:

Table 1. Estimated Hours in the Initial Regulatory Evaluation[2] to the Proposed Rule and in the Comments

[2] U.S. Department of Transportation, Federal Aviation Administration, Part 145 Initial Regulatory Evaluation. Washington DC, December 24, 1997.

SOURCE OF ESTIMATE	ESTIMATED HOURS INITIAL	RECURRENT	TYPE OF HOURS
Initial Regulatory Evaluation	8	4	technical and clerical
Comments	20-48 2-8	20-48 2-8	technical clerical
Comments	36	24	technical and clerical

Wage Rates

Because wage rate information is being addressed in another comment, this summary only addresses wage rate information in general or wage rate information that is specifically related to this comment. Commenters provided wage rates for technical and clerical labor hours, for the trainer and the trainee or they provided overall wage rates. Commenters who provided estimated wages for the trainer and the trainee erroneously interpreted that the FAA estimated $6.88 per hour for the trainer and $13.75 per hour for the trainee. They did not take into account that the FAA is assuming that the trainer would be 50 percent productive in his or her job while conducting training. The estimated cost of 1 hour of initial on-the-job training is $43.18 per trainee ($27.86 + (0.5 x $30.64)). This estimate includes 1 hour of lost wages for the trainee and 0.5 hours of lost wages for the trainer. Table 2 below presents a comparison between the wage rate estimates in the regulatory evaluation and in the comments:

Table 2. Estimated Hours in the Initial Regulatory Evaluation and in the Comments

SOURCE OF ESTIMATE	TRAINER	TRAINEE
Initial Regulatory Evaluation	$13.75	$13.75
Comments	$25.00-$187.50	$9.00-$20.95

A few commenters claim that they need a training program administrator at a cost from $20,000 to $48,000 per year, they need to design and develop a curriculum at a cost of $26,000 per year, and they need to hire a data entry person at a cost of $18,000 per year. (59, 61, 105, 125, 147, 150, 156, 159, 183, 216, 253, 261, 280, 285, 291, 321, 327, 328, 335, 374, 376, 387, 392, 395, 397, 399, 401, 404, 455, 466, 533)

Response:

Labor Hours[3]

The FAA believes that the training hours in the regulatory evaluation are appropriate and will continue to use 8 hours of initial on-the-job training and 4 hours of annual recurrent on-the-job training. These mechanics do not require a training program with even more hours because they service general aviation and work independently or for fixed base operators or smaller repair stations. At the same time, mechanics requiring a training program with a substantial number of hours will not be affected by this rule since a large portion of their business is focused on large operators that are subject to Parts 121, 135, 129, and 125 rules. And these operators currently have an established training program for mechanics.

Wage Rates

The FAA believes that it underestimated the wage rates that affect the training requirements and, therefore, has chosen to use $30.64 per hour for the trainer and $27.86 per hour for the trainee. The hourly wage rate for the trainee is based on a 1999 McGraw-Hill's "Salary Survey" and on

[3] The FAA is uncertain as to whether the number of hours stated would qualify. Nevertheless an estimate is being made in order to provide an estimate of the anticipated costs.

the number of mechanic work hours. According to the survey, mechanics earned in 1999, on average, $46,400 per year. The FAA believes that this yearly salary is representative of the mechanics that will be affected because important factors that have an impact on salaries such as size and type of aircraft repaired were taken into account at the time of estimation. This salary, adjusted using the GDP deflator to reflect an estimate in current dollars, is estimated to be $47,094 ($46,400 x (1.0590/1.0434)). $47,094 divided by 2087 hours per year, which are the typical yearly hours for most salaried workers, is estimated to be $22.57 per hour. This hourly wage rate plus fringe benefits of 23.45 percent was estimated to be $27.86. Since trainers and trainees are both mechanics, the FAA believes that trainers will only earn 10 percent more than their counterparts or $30.64 per hour.

The FAA did not use the commenters' estimates because commenters have erroneously interpreted that the trainer and the trainee have different jobs and, therefore, earn substantially different wages.

New Estimate of the Cost of Training

The new cost of initial and recurrent training over 13 years is estimated to be $52,852,300 or $30,498,400 discounted. These estimates are based on a cost of $43.18 per trainee ((0.5 x $30.64) + $27.86), which includes 0.5 hours of lost wages for the trainer who would be 50 percent productive and 1 hour of lost wages for the trainee. The FAA estimates that approximately 30,000 mechanics service general aviation. Based on a 10-percent annual attrition rate, approximately 3,000 mechanics will require initial training. As a result, the cost to

the industry of initial training will be $1,036,300 (8 hrs. x $43.18 x 3,000 mechanics). The annual cost to the industry to implement annual recurrent training will be $5,181,600 (4 hrs. x $43.18 x 30,000 mechanics). The assumptions used in this analysis are shown in the cost chapter of this regulatory evaluation.

145.205 and 145.207 Repair station manual (Final 145.207 and 145.209)

Several commenters provided cost estimates for the repair station manual. Most of them provided a cost model with labor hours and wage rates. Three different groups evolved out of the similarities and differences among all cost estimates. Group 1 provided the aforementioned cost model with overall hours. The range of hours varied from 200 to 300. A few commenters in Group 1 provided technical labor hours as well as clerical labor hours. All of these commenters estimated 240 technical labor hours and 80 clerical labor hours. Group 2 provided the same cost model in addition to cost estimates for Certificated Repair Stations, Manufacturer Maintenance Facilities, and new entrants. All commenters of group 2 estimated the following labor hours: for CRS, 240 technical and 80 clerical hours; for MMFs, 480 technical and 80 clerical hours; for new entrants, 400 technical and 160 clerical hours. Group 3 provided overall total costs and overall first year costs. However, the FAA cannot use these cost estimates because the information provided is insufficient to measure the hourly impact. See Table 3 below for a comparison between the regulatory evaluation's estimates and the commenters' estimates (76, 105, 147, 156, 159, 183, 216, 261, 280, 285, 291, 313, 314, 327, 328, 361, 374, 376, 392, 395, 397, 399, 401, 404, 446, 455, 533):

Table 3. Estimated Hours in the Regulatory Evaluation[4] to the Proposed Rule and in the Comments

SOURCE OF ESTIMATE	ESTIMATED HOURS	TYPE OF HOURS
Regulatory Evaluation	20-60	technical
Regulatory Evaluation	10-20	clerical
Comments	240-480	technical
Comments	80-160	clerical
Comments	200-300	technical and clerical

Response:

Labor Hours

The FAA believes that it underestimated the additional or incremental hours that will be required to prepare a repair station manual. The FAA has decided therefore to divide the additional time estimated in the preliminary regulatory evaluation into the incremental amount of time that some smaller repair stations will require revising the repair station manual and the time that some larger repair stations will require doing it. While for some smaller repair stations the original time is appropriate, for larger repair stations however, the FAA believes that it is not. Larger repair stations will take longer to put together their manuals because not only do they have more personnel but also they have more duties and responsibilities. Therefore, the FAA has decided to maintain its time estimate for smaller repair stations, whereas it has doubled its time estimate for larger repair stations.

The FAA did not use the commenters' estimates because commenters overestimated the hours necessary to put together the manual. Many of them assumed that they would need to write the repair station manual from the beginning, without using material that was already available to

[4] U.S. Department of Transportation, Federal Aviation Administration, Part 145 Initial Regulatory Evaluation. Washington DC, December 24, 1997.

them. However, they will only have to revise their existing manuals (unless they are not yet certificated repair stations). Therefore, many of them will only have to revise the Inspection Procedures Manual (IPM) to make it a Quality Control Manual[5].

Wage Rates

The FAA believes that it underestimated the wage rates that will be required to prepare a repair station manual and, therefore, has chosen to use $32.90 per hour for the maintenance manager and $29.61 per hour for the junior maintenance manager. The hourly wage rate for the maintenance manager is based on a 1999 McGraw-Hill's "Salary Survey". According to the survey, maintenance managers earned in 1999, on average, $54,800 per year. This salary adjusted using the GDP deflator to reflect an estimate in current dollars is estimated to be $55,619 ($54,800 x (1.0590/1.0434)). $55,619 divided by 2,087 hours per year, which are the yearly hours for maintenance managers, is estimated to be $26.65 per hour. This hourly wage rate plus fringe benefits of 23.45 percent is estimated to be $32.90. For this analysis, the FAA assumes that junior maintenance managers will receive 10 percent less than their senior counterparts or $29.61 per hour.

Other issues

[5] A Quality Control Manual is different (or could be a part of) The Repair station Manual, which is more than the Inspection Procedures Manual.

The FAA assumes that any repair station with under 75 employees would be considered as part of a group of smaller repair stations. Based on FAA statistics, there are 2,114 repair stations with 1 to 5 employees, 1,654 repair stations with 6 to 25 employees, 711 repair stations with 26 to 200 employees, and 146 repair stations with more than 200 employees. Therefore, based on when the initial regulatory evaluation was completed, at least 3,768 repair stations had fewer than 201 employees and are considered smaller than the others. That is, approximately 81 percent of the repair stations had fewer than 201 employees and are considered smaller, whereas 19 percent of the repair stations are larger.

New Estimate of the Cost Required to Prepare the Repair Station Manual

The FAA estimates that the new one-time cost to the repair station industry will be $9,821,113 or $8,578,141 discounted. Approximately 1,000 repair stations follow the guidance contained in Advisory Circular (AC) 145-3. Based on the percents of smaller and larger repair stations, 810 smaller repair stations and 190 larger repair stations follow this guidance. The cost of revising the repair station manual for these repair stations will be approximately $864,000 {810 repair stations x [(5 hrs. x $32.90) + (15 hrs. x $29.61) + (10 hrs. x $11.70)] plus 190 repair stations x [(10 hrs. x $32.90) + (30 hrs. x $29.61) + (20 hrs. x $11.70)]}. Approximately 3,625 repair stations do not follow the guidance contained in AC 145-3. Based on the percents of smaller and larger repair stations, 2,936 smaller repair stations and 689 larger repair stations do not follow this guidance. The cost of revising the repair station manual for these repair stations will be approximately $8,958,000 {2,936 repair stations x [(20 hrs. x $32.90) + (40 hrs. x $29.61) + (20 hrs. x $11.70)] plus 689 repair stations x [(40 hrs. x $32.90) + (80 hrs. x $29.61) + (40 hrs. x $11.70)]}.

Comment: Some commenters disagree with the FAA's estimated cost savings that accrue from a reduction in the number of required repair station manuals. One commenter claims that the cost is in the production of the original, not in the copies. This commenter estimates a cost saving of $15 per manual (½ hour of clerical time to run the copy machine x $27.42/hour plus $1.29 of a three ring binder), not the $105 per manual stated in the FAA's estimate. Two commenters from smaller repair stations claim that they revise their existing IPMs only once a year. They estimate that their saving in the first year would be $311.08, which they consider insignificant. The two commenters did not provide any information to support this cost saving. (291, 301, 395)

Response: The FAA agrees with the claim that the cost is in the production of the original, not in the copies and, therefore, has recalculated the cost savings. The new cost savings range from $1,139,000 to $1,708,600 annually. The details of this estimation are shown in the cost section of the regulatory evaluation. The FAA believes that $27.42/hour of clerical time is excessive as the FAA does not include direct costs such as office space and/or computer usage when computing wage rates. Only compensation paid to employees, including benefits and paid absences, are used in this estimation. The FAA estimated $11.87/hour of clerical time. The FAA can not use the estimates of the two smaller repair stations because they did not provide any support for their estimate.

Comment: A commenter referred to a cost savings of $54,900,000 as it relates to the number of repair station manuals required. This means that the 4,509 repair stations would normally have four manuals--one for Chief Inspector, one for Director of maintenance, one for the President and

one for the local FAA PMI. It also means that each manual is worth $12,175.65[6]. Since most manuals now written have approximately 116 pages--each page is worth $104.96. Since the new regulations will require the listing of all vendors used, etc., a repair station may now see an increase of between 100 and 800 pages. Using the number of 300 pages times $104.96 now adds $31,488 to each repair station costs. With 4,509 repair stations the industry will be burdened with additional costs of $141,979,392. These numbers compared to the savings of preventing 2.2 fatalities means each fatality is now worth $64,536,087 because of an increase in paperwork. (178)

Response: The commenter has confused the safety-related benefits of $54.9 million discounted with the cost savings of $14.9 million discounted from a reduction in the number of required repair station manuals. The $54.9 million would accrue from the avoidance of an average of 6.9 accidents per year, preventing 2.2 fatalities, 1.7 serious injuries, and 2.7 minor injuries, not from a reduction of required repair station manuals.

Comment: Several commenters provided cost estimates for section §145.207(d), which requires that each certificated repair station's manual include an explanation of the certificated repair station's quality assurance system. To write such an explanation, three commenters estimated that each would require three additional full time employees at a cost of $150,000 per year. This would also mean additional office space at a cost of $60.00 per square foot, for a total cost of $18,000 for the additional office space. Add to that an additional $15,000 for computers and

[6] The numbers shown here are the numbers reported to the FAA by this commenter. The commenter stated that each manual was worth $12,175.65. Upon receiving this comment, the FAA believes that each set of four manuals is $12,175.65.

furniture. A fourth commenter estimates an initial cost from $30,000 to $35,000, and annual costs of $15,000 to $18,000 to comply with §145.207(d). (127, 308, 371, 372)

Response: As stated in the Preamble, the FAA has removed the quality assurance requirements from the final rule and any references to it have been removed from the manual requirements. Issues related to quality assurance will be addressed as part of a separate rulemaking action.

Comment: Several commenters provided cost estimates for section §145.207(h), which requires that each certificated repair station's manual includes a list of the maintenance functions contracted to an outside facility with: (1) the name of the facility; (2) the type of certificate and ratings, if any, held by such a facility; (3) and procedures for qualifying and surveying the facility and for accepting maintenance, preventive maintenance, or alterations performed by the facility. Some commenters estimated that requiring this list would require a half-time person at $25,000 per year, plus office space, equipment and furniture totaling $11,000. Additionally, the commenters estimated that to further qualify and survey the outside facility would cost each of them $95,000 per year + $3000 in lost revenue. Several other commenters provided overall cost estimates for this section (61, 123, 127, 308, 371, 372).

Response: The FAA removed section § 145.207(h) from the final rule for the reasons discussed in the preamble. The FAA believes that any costs associated with this requirement will be minimal.

Comment: Two commenters provided cost estimates for section §145.207(k), which requires that each certificated repair station's manual include a capability list. Commenters estimated overall annual costs from $43,200 to $500,000. (228, 246)

Response: The FAA did not consider these estimates because the FAA cannot determine how they were calculated. Moreover, the capability list is optional and is only for limited rated repair stations (please refer to earlier discussion regarding the capability list).

145.211 Inspection of maintenance, preventive maintenance, or alterations performed (Final 145.213)

Comment: § 145.211(d) states that only a "certificated" employee is allowed to sign off the final inspections and maintenance releases. Currently, management and administrative personnel holding quality related positions sign the inspections and releases for the commenter. However, they are not eligible to be certificated as repairmen in their functions of quality assurance. This would result in redefining the quality system, eliminating positions, reassigning personnel, and training the reassigned production personnel. The resultant production time would have to be made up by overtime or hiring training, and certifying additional repairmen. The commenter purports that this provision will impose an additional cost of $9,500 to $12,700 annually to replace an employee. (247)

Response: It has always been a requirement for anyone signing off some inspections and all airworthiness releases to be certificated. Only those inspections identified as required inspection items (RII) need a certificated person to sign them off or sign off an inspection of an RII. Other inspections may be signed off by anyone in accordance with the repair station's manual. Current

section 145.39(d) states that anyone directly in charge must be certificated. For repair stations, it is not unusual to have non-certificated employees in quality assurance and control. But if they are going to be signing things like maintenance releases and return to service, they need a certificate. Repair stations use employees certificated as repairmen to perform these functions.

Repairmen are not full-fledged mechanics. These certificates are only good as long as the person remains employed by that repair station and only while performing the functions for which they have received the certificate. If an employee is a QC inspector and has been issued a repairman certificate to perform inspections and sign-offs in that capacity, the certificate becomes null and void if he or she is transferred to a different position with different functions. If, in his/her new position, a repairman certificate is needed, he or she must request another one and turn in the old certificate. These procedures are spelled out in part 65, subpart E. Anyone can, with a properly documented employment history, be eligible for a repairman certificate. All he or she has to do is request the assistance of the FAA.

145.211 Inspection of maintenance, preventive maintenance, or alterations performed (Final 145.213)

Comment: A commenter notes that § 145.211(b)(2) exposes repair stations to litigation. If a customer brings an airplane in for a tire change, an inspector should not be expected to make an airworthiness determination of the aircraft, but only the article in question. Commenter contends that if this section is not changed, he or she could incur additional liability insurance costs estimated at $250,000 per year (76).

Response: The commenter will not incur liability insurance costs because this final rule only requires the inspector to make an airworthiness determination on the article in question. The final rule has been revised to clarify this issue. The final rule, in addition, does not require any operator to purchase liability insurance. Any insurance purchase would be considered voluntary on the part of the operator.

145.219 Reports of defects or unairworthy conditions (Final 145.221).

Comment: With regard to § 145.219(b), each repair station must report the defect or unairworthy condition it discovers to the Administrator on a form and in a manner prescribed by the Administrator. This commenter does approximately 500 to 1000 aircraft inspections of company owned and outside customer aircraft in a year. He notes that he also encounters an untold number of serious and unairworthy conditions every year. Serious, and out of the ordinary defects that he encounters (which he believes need to be disseminated), are reported on FAA Form 8010-4. But, every time he finds a control cable worn on a high-time aircraft, he does not report it, as he considers this normal wear and tear. The proposed rule leaves him no latitude but to report practically every discrepancy he finds during inspections. This places him in a position of enforcer and will keep individuals from bringing their aircraft to him. Commenter estimates that this requirement would cost him $35,000 per year (a minimum of 1,000 unairworthy conditions per year x 1 hour to report each condition x $35 per hour) (76).

Response: § 145.219(b) is now in § 145.221(b). The proposal has gone through a few changes. Paragraph § 145.221 (b) basically states that the defect/condition stated in paragraph § 145.221 (a) must be reported to the Administrator in a manner prescribed by the Administrator.

The limiting factors are (1) if the repair station discovers a serious defect (meaning something extreme and out of the ordinary) or (2) a recurring airworthiness problem (not the first time they've seen a like condition). The FAA agrees with the commenter that a worn cable on a high-time aircraft would be normal wear and tear and not a serious defect or a recurring airworthiness problem. Aircraft parts (including cables) wear out, tolerances deteriorate over time, and component efficiency degrades the longer it is in service. This is normal and not within the scope of a serious defect.

However, it is up to each certificated mechanic to evaluate each discrepancy to determine if it is normal wear or not. These determinations are the precursors to many ADs and other advisories that have been issued by the agency or by the manufacturer. The FAA does not intend to remove this responsibility from the mechanics. By virtue of having their certificates, mechanics have committed themselves to returning the best possible product back to service. They have also committed themselves to letting others in the industry (including FAA) know of unusual findings to ensure unsafe and potentially fatal defects are reported so that they are evaluated and corrective action taken.

145.221 FAA Inspections (Final 145.223)

Comment: As proposed, each certificated repair station must allow the Administrator to inspect that repair station and any of its contract maintenance facilities at any time to determine compliance with this chapter. Arrangements for maintenance, preventive maintenance, or alterations by a contractor must include provisions for inspections of the contractor by the

Administrator. This action has significant business and legal consequences that could result in withdrawal of materials and articles provided by non-certificated suppliers. Such suppliers will simply cease doing business with repair stations, which will have a derogatory economic impact that the FAA did not analyze (401).

Response: The FAA has modified the language in the final rule to address this issue. The new language states that the Administrator may perform inspections of the noncertificated person to whom the maintenance, preventive maintenance, or alterations is contacted with respect to the work performed on behalf of the certificated repair station. The FAA believes that the commenter should not be negatively impacted economically.

General

Comment: Assumptions for reduced accidents are not based on any factual data. (294)

Response: The FAA reviewed a large number of accidents to determine which maintenance related accidents might have involved repair stations. From that base, the FAA estimated that the number of accidents might be reduced by as many as five to ten percent. The FAA sought public comment on the use of these estimates and acknowledges that the number of reduced accidents could be debated. The FAA chose this estimate of five to ten percent because the estimate is very low. Since the commenters did not provide any alternative and/or reasons, the FAA is maintaining the estimate as a base to be used in the regulatory evaluation for the final rule.

Paperwork Burden

The paperwork concerns of the commenters fall into the following five basic areas: capability lists, personnel, contracting, reporting defects, and general. Some of the comments are only qualitative.

Capability Lists

Comment: Several commenters noted that general aviation repair stations work on a wide variety of types, makes, and models of airframes, powerplants, propellers, appliances, and components; to list each one would take an inordinate amount of time. Many commenters did not quantify these estimated costs. Some commenters suggested changing the proposed requirement to a blanket approval for series of equipment for general aviation repair stations. Two commenters stated that to establish a capability list by part number or other item number for larger, complex repair stations would necessitate the generation of excessive paperwork and add a cost and administrative burden for both the Federal Aviation Administration (FAA) and industry.

With regard to § 145.51(a)(2), one commenter estimated that it would cost $52,500 to compile a capability list for approximately 500 line items at 3 hours per item at a rate of $35 per hour. With regard to § 145.51(a)(6), a commenter estimated a cost of $7,000 (200 contractors x 1 hour per contractor x $35 per hour) to keep a list of maintenance functions performed. Two commenters stated that they would require an additional half-time person. For the first commenter, the person would cost $25,000 per year, plus office space, equipment, and furniture totaling $11,000. For the second commenter, the person would cost

$26,000 per year, plus office space, equipment, and furniture totaling $10,500. Another commenter estimated $36,500 per year. A smaller repair station estimated that it would need to add one labor-month to cover administrative costs, or about $3,300. Cost estimates from other commenters ranged from $80 to $237 per line item. This sample of cost estimates is summarized below.

Commenter	Additional Labor	Labor Rate	Cost	Comment
A	3 hours per line item (initial cost to create capability list)	$35.00 per hour	$52,500	Based on 500 line items. Note: The 3 hours per item seems high and is not explained.
B	Technical and administrative labor	None specified	Tech: $229.14 Admin: $8.49	Total cost of $158,736 based on 668 line items.
C	Total additional labor	None specified	$29,760	Based on 4 hours per line item.
D	200 total hours; initial cost	$35.00 per hour	$7,000	Based on 200 contractors.
E	Estimated to be one person at half time	None specified	Labor: $25,000 Office: $11,000	Recurring cost.
F	Additional recurring labor	None specified	Labor: $26,000 Office: $10,500	Recurring cost.
G	Additional labor-month; initial cost	None specified	$3,000	Smaller repair station.

Response: The final rule has revised the requirements for describing articles that would be included on a "capability list" (see preamble). The final rule gives a limited-rated repair station the option of using a capability list or having the articles included on its operations specifications under a limited rating. Consequently, the costs for a capability list that were discussed in the comments need not be incurred by a repair station. Should they, however, choose the option of using a capability list, the repair station would no longer have to list the item by part number. They will be able to list it by make/model so it would not be as costly as the commenters purported it to be.

Personnel

Comment: Under proposed § 145.157(a)(4), there would have been new requirements for maintaining information about certain employees that could be used as proof that experience requirements are met. A commenter estimated that this additional paperwork burden will cost $1,190 (2 hours of labor per affected employee (mechanic) x 16 mechanics + 2 hours of administrative support labor). This commenter assumed a wage rate of $35.00 per hour. (76)

Other commenters stated that a frequent turnover of personnel could result in an excessive amount of paperwork with the new requirements. It also could result in a shutdown of the repair station while waiting for the FAA to respond to the submittal of personnel changes.

Response: The FAA has determined that the requirements of § 145.161(a)(4) are necessary to assist the agency in determining that an individual is qualified for the position held at the repair station. However, there will be no cost impact because the summary of employment is a current requirement under § 145.43.

Contracting

Comment: Commenters believe that documenting and obtaining FAA approval of each vendor before contracting and/or purchasing articles is excessive, redundant, and contrary to the Paperwork Reduction Act. Repair stations do not currently have the resources to do this. To maintain a list of functions contracted out as required by § 145.51(a)(6) would require additional staffing and consequently higher costs.

Response: Many changes in the final rule (including provisions that have been deleted) mitigate these cost concerns and are no longer relevant. Other provisions in the final rule are similar ~~to~~ provisions in the existing rule, however, there still is a requirement to maintain a list of contractors and what is contracted (see section 2, Certificate Holder, below). Commenters' cost estimates did not separate out this particular cost item, and the FAA does not believe that this impact will be significant.

Reporting Defects

Comment: One commenter estimated that this requirement (reports of defects or unairworthy conditions) would cost $35,000 per year (a minimum of 1,000 unairworthy conditions per year x 1 hour to report each condition x $35 per hour).

Response: It is not clear how this commenter compares these costs to the costs associated with similar reporting requirements already in the regulations (§ 145.63). That is, the FAA is not sure what baseline the commenter is using to measure costs.

General

Comment: Commenters stated that the proposal is overly burdensome, confusing, and redundant. The commenters contended that the proposal requires the repair station to keep more records than any other certificate holder performing maintenance, preventive maintenance, or alteration on civil aviation articles. One commenter estimated the following overall costs to put into effect the proposed change to part 145.

Type of Cost	Labor	Labor Cost	New Hardware & Software	Comment
Initial ($352,720)	Computer enhancements	$25,000	Hardware: $25,000 Software: $25,000	
	Manuals revision: two technical writers	$129,920		Based on $1,624 per week x 80 weeks
	Clerical staff for data entry	$172,800		Based on 6 clerks at $360 per week x 80 weeks
Recurring ($590,720)	Additional: Nine technicians Two inspectors Six clerks	 $340,704 $104,000 $146,016		A breakdown of where all the additional labor would be needed was not included.

Response: Most of these cost estimates are for proposed requirements that are no longer in the final rule. In addition, commenters did not provide sufficient detail to analyze the cost estimates related only to those provisions that remain.

Contract Maintenance

For all practical purposes, the proposal included the same requirements for contracting with a certificated source as for contracting with a noncertificated source. Commenters were particularly concerned about the requirements related to certificated sources. The final rule treats these two cases differently.

Certificate Holder

Comment: The proposal required a repair station to ensure that the contracting repair station met quality control, inspection, and manual requirements of part 145. Further, as proposed

in the NPRM, this would require qualifying and surveilling procedures of the repair station as specified in proposed § 145.207(h)(3). (Proposed § 145.207 included a description of all the items required in the repair station manual.) This qualifying and surveilling responsibility was the subject of many comments. Commenters opposed the associated costs and argued that the FAA is responsible for qualification and surveillance of certificate holders and this should not be duplicated by the industry.

Response: The final rule has substantially modified this portion of the proposed section related to contract maintenance. Repair stations only have to surveil noncertificated contractors per § 145.217. Consequently, most of the commenters' cost concerns about this proposal are no longer relevant.

Noncertificated Persons

Comment: The proposal required that a repair station could only contract to a person who met the quality control, inspection, and manual requirements of part 145. The repair station would be required to qualify and surveil procedures of the non-certificated person as specified in proposed § 145.207(h)(3).

Response: The final rule (§ 145.217(b)) that relates to this subject requires the repair station to ensure that the contract person meets only the quality control requirements of § 145.211. Also, the repair station manual must contain procedures for qualification and surveillance of noncertificated sources.

Because § 145.211 as found in the final rule applies to a certificate holder, the new requirements found in § 145.217 of the final rule must be interpreted to mean equivalent quality control procedures, as they would apply to any person. The parts that refer to FAA approval or acceptability to the Administrator would obviously not apply to a noncertificated person.

Although ensuring that a noncertificated source accomplishes its work in a quality manner the responsibility of a repair station under the current rule, there currently is no explicit requirement to verify that specific quality control procedures are in place at a contractor. Nor is there currently a regulatory requirement for including qualifying and surveilling procedures in a repair station manual. The commenters did not seem to be as concerned about the quality oversight requirements related to noncertificated contractors as they were in the case of certificated contractors. In addition, the commenters' cost estimates did not separate the two situations. Based on the general quality oversight responsibilities in today's environment, it is reasonable to assume that additional cost burdens for quality monitoring of noncertificated contractors that might occur as a result of the final rule would be relatively minimal.

The remaining contract maintenance requirements in the final rule do not appear to have significant cost impacts; however, one commenter indicated that the limitations on what may be contracted out to a certificated source would limit the flexibility of a repair station from a business point of view. In particular, this would constrain business options in an

over-capacity situation. (Presumably this relates to proposed § 145.213(c).) There was no quantitative information provided by this commenter.

Issues that Impact General Aviation and/or smaller repair facilities only

Potential Impacts on Safety

Comment: Several commenters expressed concerns about the indirect effects on safety of increasing costs. They argued that if costs increased, it would not only put smaller repair stations out of business but would encourage aircraft operators to forego maintenance or to have maintenance accomplished by unqualified persons.

Response: The FAA believes that the proposed rule will improve safety. The commenters provided no additional information to substantiate their claims that there would be a diminution of safety.

Disproportionate Burden

Comment: Several commenters expressed concern that certain cost impacts would have a relatively significant effect on smaller repair stations. These are summarized in the following table.

Comment	Cost Impact	Comment
A	An increase of 130% in operating costs	Commenter indicated the repair station is very small, but provided no other information.
B	An increase of 15% to 25% in operating costs	No repair station size was given.
C	Initial: $15,000 Annual: $2,600	Costs are for additional storage requirements. Commenter noted this is a problem for smaller repair stations.
D	Total cost estimate: $250,000	Commenter noted that this smaller repair station is not equipped to store the occasional large part.
E	Training cost of 11 staff members: $8,775	Commenter noted particular impact on small businesses and provided cost estimates for several proposed requirements. (Training is the only one left in the draft final rule.)
F	Legal and administrative labor for deviations	Commenter noted disproportionate effect on smaller repair stations, concluding that deviation would not be practical.
G	Training cost per person per week: $1,500 Travel and per diem: $1,100	Commenter noted that the total cost is $5,200, which exceeds the $5,000 guideline for small entities per the Regulatory Flexibility Act.
H	Training cost for 30 persons at $797.74: $23,932	Commenter estimated costs for several proposed new requirements; however, only the training estimate is still relevant.
I	Several comments on relatively large cost impacts, but qualitative only.	Most of the areas cited are no longer in the draft rule language. No breakdown of costs for each area was given.

Response: Each of these issues described above has been addressed in detail in this regulatory evaluation. The only provision that may result in a significant cost impact is on training. The FAA, as calculated in the cost section, concludes that the impact associated with training is much less than that shown above and it alone in combination with the other requirements will not have a significant cost impact as described in the regulatory flexibility analysis for the final rule.

Transition Issues

Rating and Class Changes

Comment: The majority of the commenters that indicated the transition to the new system would be costly based their comments on the fact that the FAA proposed substantial

changes to the schedule of ratings and classes (reference § 145.59). The changes that repair stations would have to make for this new system were analyzed and cost estimates were presented in terms of cost per rating.

Response: The FAA is retaining the current rating system. Consequently, these transition cost concerns are no longer relevant.

Burden on the FAA

Comment: One commenter stated that there are approximately 5,000 repair stations. The commenter contended that it is overly ambitious for the FAA and industry to process 5,000 applications for new certificates, perform required inspections, and approve repair station manuals in 2 years. The commenter stated that this would lead to substantial delays. The commenter suggested that the compliance timeframe be extended to at least 4 years for current repair stations to transition to the requirements.

Response: The majority of concerns related to the FAA approvals or acceptance of new manuals, new ratings/classes, new capability lists, etc., are no longer relevant. In terms of compliance time-frames, the FAA has modified the final rule to allow for an extended effective date and has revised the time for transition.

3.0 BENEFITS AND COSTS

In conducting this study, a combination of qualitative and quantitative approaches were used to obtain data and estimate economic and safety impacts. Material was gathered and reviewed by numerous individuals and entities, including the Flight Standards Service and Office of

Rulemaking. The contractor, Phaneuf Associates Incorporated (PAI)[7], provided substantial assistance in preparing the information that the economic analysis for the NPRM was based upon. This economic analysis is based on many of the same sources as well as comments to the FAA docket.

3.1 General Estimates, Assumptions, and Methodology Used for Benefit and Cost Analysis

Benefits and costs have been calculated for 13 years using a discount factor of 7 percent. All values are in current dollars. Benefits and costs have been calculated for 13 years to account for the fact that the effective date of the rule is expected to be late 2002[8]. The training program is expected to be submitted to the FAA two years after the effective date or late 2004. The period of 13 years allows for a 10-year discount period plus three years to account for the implementation of certain provisions. Slight variances in benefits and costs may occur due to rounding. Where appropriate, the present value of each provision is based on the year in which the entities will be required to comply with this provision. Consequently, discounted costs will be lower than if the costs were to occur immediately.

This analysis is based on several FAA and aviation industry estimates and assumptions, some of which are identified in Table 1, *Unit Cost Estimates*. The FAA, in addition, updated these estimates using material provided by commenters to the FAA docket.

Table 1. Unit Cost Estimates (2000 Dollars)[9]

[7] Phaneuf Associates Incorporated. Initial Regulatory Evaluation, Initial Regulatory Flexibility Analysis, and International Trade Impact Analysis. Prepared for Volpe National Transportation Systems Center Cambridge, Massachusetts Under Contract No. DTRS-57-95-00041. Technical Task Directive No. 8. February 23, 1996.

[8] This analysis however assumes three complete years before all provisions are fully implemented.

[9] U.S. Department of Transportation, Federal Aviation Administration, Office of Aviation Policy and Plans, Economic Analysis of Investment and Regulatory Decision - A Guide. (FAA-APO-98-4: January 1996). The

Item	Cost
Scheduled Commercial Service (Passenger and freight) restoration cost stated in current dollars using the Gross Domestic Product (GDP) implicit price deflator.[10]	$1,747,864 per aircraft
Population weighted replacement cost for general aviation aircraft, including air taxi, stated in dollars using the GDP implicit price deflator.[11]	$41,126 per aircraft
Population weighted air carrier replacement cost, stated in current dollars using the GDP implicit price deflator. [12]	$12,934,194 per aircraft
Population weighted restoration cost for non-commercial general aviation aircraft, including air taxi, stated in current using the GDP implicit price deflator.[13]	$41,126 per aircraft
Replacement cost for all turbine-powered rotorcraft stated in current dollars using the GDP implicit price deflator. [14]	$959,742 per aircraft
Restoration cost for all turbine-powered rotorcraft stated in current dollars using the GDP implicit price deflator.[15]	$157,206 per aircraft
Value of 1 hour of FAA administrative support personnel time (GS-7, Step 5). ($32,713/2,087 = $15.67/hour)[16]	$20.75 per hour
Value of 1 hour of FAA inspector personnel time (GS-13, step 5). ($69,008/2,087 = $33.07/hour)[17]	$43.80 per hour

value of employee time includes the value of employee wages plus benefits and is equal to total wages multiplied by 1.3245 for government employees and 1.2345 for private industry employees.

[10] U.S. Department of Transportation, Federal Aviation Administration, Office of Aviation Policy and Plans, Economic Values for Evaluation of Federal Aviation Administration Investment and Regulatory Programs. (FAA-APO-98-8: June 1998, p. 5-12) 86. (($1,700,000 x 1.059/1.030 = $1,747,864)

[11] Economic Values p. 5-12. (($40,000 x 1.059/1.030 = $41,126)

[12] Economic Values 5-12. (($12,580,000 x 1.059/1.030 = $12,934,194))

[13] Economic Values 5-12. (($40,000 x 1.059/1.030) = $41,126)

[14] Derived from Economic Values 5-6. (($933,460 * 1.059/1.030) = $959,742)

[15] Derived from Economic Values 5-7. (($152,901 x 1.059)/1.030 = $157,206)

[16] U.S. Office of Personnel Management (OPM), 2000 General Schedule Locality Rates of Pay for Washington-Baltimore DC-MD-VA-WV (include St. Mary's County, MD). ($15.67/hour * 1.3245 = $20.75)

[17] OPM 2000 General Schedule. ($33.07/hour x 1.3245 = $43.80)

Item	Cost
Value of 1 hour of FAA supervisor personnel time (GS-14, level 5). ($81,546/2,087 = $39.07/hour)[18]	$51.75 per hour
Value of 1 hour of repair station administrative support personnel time (Secretary/CRT Operator).[19]	$11.87 per hour
Value of 1 hour of repair station junior maintenance management personnel time (Maintenance Supervisor).[20]	$32.90 per hour
Value of 1 hour of repair station maintenance management personnel time (Maintenance Manager).[21]	$29.61 per hour
Average annual revision cost of manufacturer's airframe service manual for large aircraft stated in current dollars using the GDP implicit price deflator.[22]	$9,054 per year
Average annual revision cost of manufacturer's powerplant service manual for reciprocating engines stated in current dollars using the GDP implicit price deflator.[23]	$73 per year
Average annual revision cost of manufacturer's powerplant service manual for turboshaft/turboprop engines stated in current dollars using the GDP implicit price deflator.[24]	$453 per year
Average annual revision cost of manufacturer's powerplant service manual for turbojet/turbofan engines stated in current dollars using the GDP implicit price deflator.	$453 per year
Cost of off-the-shelf guide to developing a quality assurance system stated in current dollars using the GDP implicit price deflator.[25]	$591 per unit

[18] OPM 2000 General Schedule. ($39.07/hour x 1.3245 = $51.75)

[19] Based upon information obtained from public comments. The average hourly wage and charge amounts are calculated using the aggregate summary earnings with benefits attributed to the 1999 AEA Rate and Labor Survey ($11.70 * (1.059/1.0434) = $11.87.

[20] This hourly wage rate is based on a 1999 McGraw-Hill's "Salary Survey". This wage rate includes fringe benefits of 23.45 percent.

[21] This hourly wage rate is based on a 1999 McGraw-Hill's "Salary Survey". This wage rate includes fringe benefits of 23.45 percent.

[22] Interview with the National Air Transportation Association (NATA), 21 April 1993. ((8,000 x 132.0)/123.5 = $8,550; $8,550 x 1.059/1.000 = $9,054)

[23] NATA Interview, 21 April 1993. ((65 x 132.0)/123.5 = $69; $69 x 1.059/1.000 = $73)

[24] NATA Interview, 21 April 1993. ((400 x 132.0)/123.5 = $428; $428 x 1.0590/1.000 = $453)

[25] NATA Interview, 21 April 1993. ((522 x 132.0)/123.5 = $558; $558 x 1.059/1.00 = $591)

Estimates and assumptions that are unique to calculating the benefits or costs of a provision are identified before the topic's discussion. The following estimates apply throughout the analysis.

Estimates:

- Based on FAA statistics, 4,625 domestic repair stations are certificated under part 145.[26]
- Based on the Joint Aviation Authorities (JAA) estimates, 1,110 (24 percent) repair stations service part 121 or 135 (air carrier) operations.[27] Approximately 3,515 (76 percent) repair stations service part 91 (general aviation) operations (estimates adjusted to 1997).

This analysis contains benefits resulting from the elimination of fatalities and injuries. The FAA currently uses a value of $2.7 million to statistically represent a human fatality that is avoided.[28] This value provides the public and government officials with a benchmark comparison of the expected safety benefits of rulemaking actions over an extended period of time with estimated costs in dollars. A serious injury is valued at $521,800 and a minor injury is valued at $38,500. These estimates have remained constant through 2000.

The intent of this evaluation is to examine the impact of final part 145 on the U.S. economy. The revisions to part 145 will affect repair stations and Manufacturer's Maintenance Facilities

[26] GRA Incorporated. An Analysis of International Trade Flows in Aircraft Repair Services. Prepared for Regulatory Analysis Division, Office of Aviation Policy and Plans. Federal Aviation Administration. Washington, D. C. Under Contract No. DTFA01-93-C-00066. Work Order 46. Washington, D. C. September 30, 1997. p. 12.

[27] "Will JAA Regulations Affect U.S. Competitiveness?," Aerospace Industries Association Newsletter, April 1993, vol. 9.

[28] U.S. Department of Transportation, Federal Aviation Administration, Office of Aviation Policy, Plans, and Management Analysis Bulletin dated March 1995 (APO-95-1).

(MMFs) located in the United States as well as repair stations located outside the United States. However, this regulatory evaluation estimates only the benefits and costs to U.S. entities. Because the majority of the 522 repair stations that are located outside of the United States are not U.S. entities, the benefits and costs that will be incurred by these repair stations are not included in this regulatory evaluation. Unless otherwise stated, references to the number of repair stations include only the estimated 4,625 domestic repair stations.

3.2 Costs of the Final Rule by Topic

In addition to revising part 145, the final rule includes minor revisions to parts 91, 121, and 135. These revisions are limited to section references. Therefore, these revisions, if adopted, will impose no additional benefits or costs. Additionally, many of the changes to part 145 revise the organization and format of the current regulation and will not impose any costs. In some cases, the final rule may provide benefits or impose costs; however, no data are available to quantify the benefits or costs of these changes. To the extent practicable, however, these potential benefits and costs have been identified.

3.2.1 Operations and Inspections Procedures

3.2.1.1 Repair Station Manual

A repair station manual will be required under final §145.207 and §145.209 and a quality control manual will be required under §145.211. These sections will require a repair station to maintain and use a current acceptable repair station manual that sets forth the procedures and policies for the repair stations operations. These sections will also require a quality control manual to replace the existing inspection procedures manual.

The current rules do not specifically require a repair station manual but do require that repair stations maintain an Inspection Procedures Manual (IPM). Final §145.207 and §145.209 will require a repair station to maintain a current acceptable repair station manual that sets forth the procedures and policies for the repair station's operations. Repair stations will be required to have a manual accessible for use by repair station personnel rather than readily available. The manual must be accessible to personnel when the work is being performed and may be in any format acceptable to the FAA including but not limited to a paper or electronic format. Final §145.209 describes the required contents of the repair station manual. The FAA has revised the proposal by deleting requirements for names of specific personnel in the organization chart, only functional titles will be required.

Current part 145 does not specify, in detail, what information should be included in the IPM. However, the IPM currently must contain an explanation of the repair station's inspection procedures. Many repair stations currently use Advisory Circular (AC) 145-3, Guide for Developing and Evaluating Repair Station Inspection Procedures Manuals, as the basis for developing an IPM. AC 145-3 recommends including many of the items that will be required under final part 145.

Repair stations that do not follow guidance contained in AC 145-3 will be required to include material from this AC in their repair station manuals. This assumption assumes that repair stations will include among other things:

- A description of the certificated repair station's operations, including the housing, facilities, equipment, and material.
- Procedures for maintaining and revising the contract maintenance information.
- Procedures for revising the capability list (if applicable).
- A description of the required records and the recordkeeping system used to obtain, store, and retrieve the required records.

Under final §145.211, a certificated repair station must also establish and maintain a quality control system acceptable to the Administrator that ensures the airworthiness of the articles on which the repair station or any of its contractors performing maintenance, preventive maintenance, or alterations. To implement this requirement, the final rule requires the repair station to keep a quality control manual and delineates the items that must be included in that manual. The quality control manual may be separate from the repair station manual or included with that manual as a separate section or volume. The quality control system will describe everything else that's currently listed in AC 145-3 (incoming/final inspections, technical data requirements, calibrated equipment, etc).[29]

Based on FAA statistics, 128,767 mechanics were employed at domestic repair stations in February 1997.[30] The total number of ratings for FAA certificated domestic repair stations is approximately 13,444.[31]

[29] To reiterate, the FAA will require two manuals (or two sections of a manual). One is the repair station manual and the other is the quality control manual.

[30] National VIS, February 1997. The number of mechanics includes certificated mechanics, non-certificated mechanics, and repairmen.

[31] National VIS, February 1997.

The assumptions that follow for larger repair stations are somewhat different than those contained in the preliminary regulatory evaluation for the proposed rule. In the preliminary regulatory evaluation, the assumptions associated with the time required to complete certain tasks were assumed to be the same, regardless of the size of the entity. For this regulatory evaluation and based upon the comments received, the FAA has chosen to double the number of hours that it will take larger repair stations to complete certain tasks.

Assumptions:

- Approximately 1,000 repair stations currently follow the guidance contained in AC 145-3.[32]
- The cost of establishing a repair station manual for repair stations that follow the guidance contained in AC 145-3 will be approximately $727 per smaller repair station and $1,455 per larger repair station. Smaller repair stations will employ 5 hours of maintenance management time, 15 hours of junior level maintenance management time, and 10 hours of administrative support personnel time ((5 hrs. x $32.90) + (15 hrs. x $29.61) + (10 hrs. x $11.87) = $727.35). Larger repair stations will employ 10 hours of maintenance management time, 30 hours of junior level maintenance management time, and 20 hours of administrative support personnel time ((10 hrs. x $32.90) + (30 hrs. x $29.61) + (20 hrs. x $11.87) = $1,454.70).[33]
- The cost of establishing a repair station manual for repair stations that do not follow the guidance contained in AC 145-3 will be approximately $2,080 per smaller repair

[32] NATA Interview, 21 April 1993.

[33] NATA Interview, 21 April 1993.

station and $4,160 per larger repair station. Smaller repair stations will employ 20 hours of maintenance management time, 40 hours of junior level maintenance management time, and 20 hours of administrative support personnel time ((20 hrs. x $32.90) + (40 hrs. x $29.61) + (20 hrs. x $11.87) = $2,079.80). Larger repair stations will employ 40 hours of maintenance management time, 80 hours of junior level maintenance management time, and 40 hours of administrative support personnel time ((40 hrs. x $32.90) + (80 hrs. x $29.61) + (40 hrs. x $11.87) = $4,159.60)[34]. Reproduction and paperwork costs are not included.

- Approximately 10 percent of repair station mechanics are employed as supervisors.[35] Based on this assumption, the industry employs approximately 12,877 supervisors.
- At least one inspector is employed for each rating held by a repair station.[36] Based on this assumption, the repair station industry employs at least 13,444 inspectors.
- The estimated annual administrative cost to maintain one manual is $107. This estimate includes three revisions per year, each of which will require 3 hours of administrative support personnel time to complete (3 revisions x 3 hrs. x $11.87 = $106.83).[37]

Cost Savings:

Based on FAA statistics and information provided by industry that was used in the preliminary regulatory evaluation, repair stations are estimated to employ approximately 12,900 supervisors

[34] NATA Interview, 21 April 1993.

[35] NATA Interview, 21 April 1993.

[36] NATA Interview, 21 April 1993.

[37] NATA Interview, 21 April 1993.

and at least 13,400 inspectors. These repair stations must maintain approximately 26,300 IPMs. Because of the complexity of many repair stations' operations, the repair stations should document additional aspects of their operations not covered in the current IPM. Therefore, the FAA will eliminate the requirements that repair stations maintain an IPM and replace it with a requirement that repair stations maintain an acceptable quality control manual and require the repair station to maintain a repair station manual to document operational procedures. Also, the current requirement for all repair stations' supervisory and inspection personnel to each have a copy of the manual has been withdrawn. In the final rule, only 4,600 repair station manuals will be required to be maintained, so the total number of required manuals will be reduced by 21,700. Final § 145.207 will require only that the repair station manual be accessible for use by repair station personnel.

In 1999, when the preliminary regulatory evaluation was prepared, the FAA estimated that the reduction in manuals would result in an annual cost saving to the industry of $105 per manual, with a cost saving to the industry of approximately $2.28 million annually, which updated to current dollars is $2.32 million. Some commenters disagreed with the cost saving. One claimed that the cost of the manuals is in the production of the originals, not in the copies. The FAA agrees with this commenter and believes that the original cost savings estimates may have been very high. Although no information was provided to the FAA, the FAA believes the actual cost saving may range only between $580,000 (or $2.32 million x 25 percent) and $1,160,000 (or $2.32 million x 50 percent) annually, between $6.96 million and $13.93 million total, or between $4.31 million and $9.22 million discounted. The FAA believes that the range from 25 to 50 percent covers the full extent of possible outcomes.

Cost:

The following are separate estimates of the cost to establish a repair station manual as required by final § 145.207 for repair stations that currently follow the guidelines of AC 145-3 and for repair stations that do not follow the guidelines.

Approximately 1,000 repair stations follow the guidance contained in AC 145-3. Of the 1,000 repair stations, approximately 810 smaller repair stations and 190 larger repair stations follow the guidance. These repair stations will have to revise their current IPM to include many new sections in order to comply with the final requirements of the repair station manual (that will also include the quality control manual). The cost to these repair stations to revise their IPM to meet the requirements of final § 145.209 is estimated to be approximately $727 per smaller repair station and $1,455 per larger repair station, or a total of approximately $866,000 {810 repair stations x [(5 hrs. x $32.90) + (15 hrs. x $29.61) + (10 hrs. x $11.87)] plus 190 repair stations x [(10 hrs. x $32.90) + (30 hrs. x $29.61) + (20 hrs. x $11.87)]}.

Approximately 3,625 repair stations do not follow the guidance contained in AC 145-3. Of the 3,625 repair stations, approximately 2,936 smaller repair stations and 689 larger repair stations follow the guidance. The cost to these repair stations to revise their IPM and to meet the requirements of final § 145.209 is estimated to be approximately $2,080 per smaller repair station and $4,160 per larger repair station, or a total of approximately $8.97 million {2,936 repair stations x [(20 hrs. x $32.90) + (40 hrs. x $29.61) + (20 hrs. x $11.87)] plus 689 repair stations x [(40 hrs. x $32.90) + (80 hrs. x $29.61) + (40 hrs. x $11.87)]}. The FAA estimates that

the total one-time cost to the repair station industry will be approximately $9.84 million or $8.59 million discounted.

3.2.1.2 Quality Assurance and Quality Control

Proposed § 145.201 required each repair station to establish and maintain a quality assurance system acceptable to the Administrator. The FAA estimated that repair stations were going to incur a total one-time cost of approximately $1.47 million and annual costs of approximately $12.12 million on this quality assurance system. However, for the final rule, the FAA withdrew this requirement and, therefore, no cost will be incurred by these repair stations for the quality assurance system. The FAA intends to issue a subsequent NPRM that will address this issue.

3.2.2 Availability of Airworthiness Directives and Manufacturer's Service Manuals

Current § 145.57(a) requires that all repair stations maintain, in current condition, all manufacturers' service manuals, instructions, and service bulletins that relate to the articles that they maintain or alter. Final § 145.211 (a) will require repair stations to maintain all airworthiness directives (ADs), Instructions for Continued Airworthiness, and service bulletins that relate to articles that they maintain or alter and to possess current manufacturers' service manuals relating to an article when the maintenance or alteration on the article is actually performed. The final rule will impose no additional cost.

3.2.2.1 Airworthiness Directives

Final § 145.211 places into the Federal Aviation Regulations the already existing requirements

(i.e., FAA Order 8300.10) that a repair station needs to meet to perform work[38]. FAA Order 8300.10 identifies the technical data a repair station should have; this data includes ADs. Current § 39.3 states that no person may operate an aircraft, aircraft engine, propeller, or appliance to which an AD applies, except in accordance with the requirements of that AD. A repair station should be aware of any airworthiness information that directly affects the continued airworthiness of the articles on which it performs work. Therefore, assuming that repair stations currently maintain ADs that relate to the articles on which they perform work, the final rule will not impose any additional cost.

3.2.2.2 Manufacturers' Service Manuals

The FAA has determined that there will be no incremental costs associated with this aspect of the final rule. Instead, there will be cost savings because repair stations will no longer constantly maintain as many manufacturers service manuals.

The following estimates were used to calculate the costs of this provision. [39]

- There are 848 repair stations with a Class 1 or 3 airframe rating (small aircraft).
- There are 97 repair stations with a Class 2 or 4 airframe rating (large aircraft).
- There are 174 repair stations either with a Class 1 (reciprocating engine, 400 hp or less) powerplant rating or a Class 2 (reciprocating engine, more than 400 hp) powerplant rating.
- There are 29 repair stations with a Class 3 (turbine engine) powerplant rating.

[38] FAA orders do not impose requirements on the public.
[39] National VIS, February 1997.

- There are 1,547 repair stations with a limited airframe rating.
- There are 1,381 repair stations with a limited powerplant rating.

Assumptions:

- Repair stations with airframe or powerplant ratings maintain approximately seven different manufacturer's service manuals for the articles that they maintain or alter.[40]
- Repair stations with limited ratings maintain approximately one manufacturer's service manual for the article(s) that they maintain or alter.
- This evaluation assumes that repair stations will no longer constantly maintain manufacturers service manuals.
- As was mentioned before, the cost of the manuals is in the production of the original manual, not in the production of the duplicate manuals. Therefore, repair stations will not obtain full cost savings--they will obtain from 25 to 50 percent of the cost savings.

Based on the above estimates and assumptions (including that repair stations will no longer constantly maintain manufacturers service manuals) and the unit cost values contained in Table 3, the FAA estimates that:

- Repair stations that have a Class 1 or 3 airframe rating (small aircraft) and maintain at least seven manufacturer's service manuals will benefit from annual savings between

[40] NATA Interview, 21 April 1993.

$877,000 ($591 x 848 repair stations x 7 manuals x 25 percent) and $1.75 million ($591 x 848 repair stations x 7 manuals x 50 percent).

- Repair stations that have a Class 2 or 4 airframe rating (large aircraft) and maintain at least seven manufacturer's service manuals will benefit from annual savings between $1.54 million ($9,054 x 97 repair stations x 7 manuals x 25 percent) and $3.07 million ($9,054 x 97 repair stations x 7 manuals x 50 percent).
- Repair stations that have a Class 1 or 2 powerplant rating and maintain at least seven manufacturer's service manuals will benefit from annual savings between $22,000 ($73 x 174 repair stations x 7 x 25 percent) and $44,000 ($73 x 174 repair stations x 7 x 50 percent).
- Repair stations that have a Class 3 powerplant rating and maintain at least seven manufacturer's service manuals will benefit from annual savings between $23,000 ($453 x 29 repair stations x 7 manuals x 25 percent) and $46,000 ($453 x 29 repair stations x 7 manuals x 50 percent).
- Repair stations that have a limited airframe rating and maintain at least one manufacturer's service manual will benefit from annual savings between $565,000 (These cost savings as estimated by the FAA are based on a weighted average of repair stations with Class 1 or 3 airframe rating, and repair stations with a Class 2 or 4 airframe rating) (((848 x $591) + (97 x $9,054) x 1,547)/945 multiplied by 25 percent) and $1.13 million (((848 x $591) + (97 x $9,054) x 1,547)/945 multiplied by 50 percent)
- Repair stations that have a limited powerplant rating and maintain at least one manufacturer's service manual will benefit from annual savings between $44,000

(((174 x $73) + (29 x $453) x 1,381)/203 multiplied by 25 percent) and $88,000

(((174 x $73) + (29 x $453) x 1,381)/203 multiplied by 50 percent)

(The cost savings are based on a weighted average of repair stations with a Class 1, 2, or 3 powerplant rating.) The repair station industry will benefit from cost savings between $3.07 million and $6.14 million annually, between $36.81 million and $73.62 million total, or between $22.77 million and $45.54 million discounted.

No cost savings benefit is expected for repair stations with propeller, radio, instrument, or accessory ratings. Because these manuals are less specialized and relatively less costly than airframe or powerplant manuals, it is likely that repair stations with these ratings will continue to maintain manufacturers' service manuals for the articles that the repair station maintains or alters. In addition, no initial cost savings associated with the purchase of a manufacturer's service manual are estimated because a repair station performing work will currently have all the necessary manuals.

3.2.3 Recordkeeping

Final § 145.219 will require a certificated repair station to maintain in the English language records that demonstrate compliance with the requirements of parts 43 and 145. This final rule, compared to the proposal, will no longer list any specific requirements that must be maintained. The rule retains the two-year retention period and the requirement to provide a copy of the maintenance release to the owner's or operator's agent. The rule does not preclude an operator or owner from making such arrangements between the repair station and the owner.

Final § 145.219 (b) will require each repair station to give the owner or operator of the article a copy of the maintenance release record or the information completed to comply with § 43.9 or § 43.11, in English. It is currently common practice to give a customer a copy of the work order or the information contained in the work order. Therefore, the FAA has determined that the requirement to distribute a copy of the work record in final § 145.219 (b) will not impose additional costs.

3.2.4 FAA Training and Advisory/Guidance Material

The FAA will train Aviation Safety Inspectors (ASIs) on the changes to part 145 and the new programs that will be included in the final rule (training programs, capability lists, etc). The FAA expects that the ASIs' one-time training will occur in 2002.

Assumption

- Initially, a GS-14 will travel from Washington, DC to the eight regional FAA locations[41] and incur one day of training using the help of a GS-5, regional specialist. The GS-5 will not incur any travel costs because he or she is stationed at the regional location. It is also estimated that the GS-14 will travel for approximately thirteen days.
- Subsequently, the eight Regional Specialists will spend eight hours to train the ASIs in their regions.
- The travel costs are based on the General Services Administration's (GSA) fares and Per Diems, which are established annually by GSA for travelers on official Government business.

- 2,000 hours of a GS-14, step 5 and 1000 hours of a GS-5, step 5 are needed to complete the Advisory/Guidance Material.

Cost:

The estimated cost of a GS-14 traveling to the eight regional FAA locations and training the regional specialists is $14,200 (($3,084 for traveling[42] + $1,259 for Per Diems[43], includes lodging, meals, and incidental expenses) plus (13 days x 8 hrs. x $39.07 per GS-14 for travel time) plus (8 hrs. x 8 regions x $39.07 per GS-14 for the training)). Additionally, the estimated cost of eight regional specialists training for eight hours is $2,500 (8 hours x 8 regional specialists x $39.07 per regional specialist). And, the estimated cost of a GS-5 helping for eight hours is $810 (8 hrs. x 8 regions x $12.65 per GS-5).

Subsequently, the regional specialists will train 48 ASIs. The training cost for the 48 ASIs is $10,700 (8 hrs. x 48 ASIs x $27.81 per ASI); the training cost for the eight regional specialists that will be training the ASIs is $2,500 (8 hrs. x 8 regional specialists x $39.07).

The estimated cost for the Advisory and Guidance Material is $90,800 (2,000 hrs. x $39.07 per GS-14 plus 1000 hrs. x $12.65 per GS-5).

[41] Seattle, Los Angeles, Anchorage, Ft. Worth, Kansas City, Chicago, Atlanta, and Boston.
[42] Roundtrip fares from DC: to Seattle = $300, to Los Angeles = $188, to Anchorage = $926, to Ft.Worth = $460, to Kansas City = $508, to Chicago = $212, to Atlanta $350, and to Boston = $140.

Based on the information above, the FAA will incur a one-time cost in 2002 of $115,700 or $101,000 discounted.

3.2.5 Personnel Requirements

The FAA will organize all part 145 repair station personnel requirements into a separate subpart of part 145, which will be entitled Subpart D–Personnel. It will also include new requirements for the repair stations relating to training, personnel records, and the recommendation of persons for certification as repairmen.

3.2.5.1 Training Requirements

In final § 145.161, the FAA will require that each repair station establish and maintain a training program. Current § 121.375 and part 119 require that each certificate holder under part 121, or each certificate holder under part 135 operating airplanes with seating configurations of 10 to 30 seats (excluding any crewmember seat), and those conducting scheduled passenger-carrying operations in turbojet airplanes, regardless of seating configuration, or any person performing maintenance or preventive maintenance functions for such a certificate holder, establish a training program. This training program must ensure that each person who determines the adequacy of work done is fully informed about procedures, techniques, and new equipment in use and is able to perform all associated duties. The training program is expected to be submitted to the FAA two years after the effective date or late 2004. Current § 145.2(a) requires that repair stations supporting operations under part 121 comply with the provisions of § 121.375.

[43] Per Diems: Seattle = $155, Los Angeles = $145, Anchorage = $155, Ft.Worth = $132, Kansas City = $127, Chicago = $176, Atlanta = $131, and Boston = $238.

Assumption:

- Repair stations employ approximately 30,000 mechanics who service general aviation
- The attrition rate for mechanics who service general aviation is approximately 10 percent.[44]
- Repair station personnel will require 8 hours of initial on-the-job training and 4 hours of annual recurrent on-the-job training.[45]
- Personnel receiving training will not be productive in their job while receiving training. Mechanics that administer training will be 50 percent productive in their job while conducting training.[46]

Cost:

Approximately 1,000 repair stations, currently perform maintenance or preventive maintenance for part 121 or 135 operators and are thereby required to have an established training program for employees who perform maintenance for these operators. These repair stations will not incur any additional costs.

It is difficult to determine the cost of training the 30,000 remaining mechanics at those 3,625 repair stations servicing general aviation aircraft. Various types of maintenance training courses are offered throughout the country. For the purpose of the evaluation, the FAA estimates

[44] U.S. Department of Transportation, Federal Aviation Administration, Pilot and Aviation Maintenance Technician Blue Ribbon Panel. Pilots and Aviation Maintenance Technicians for the Twenty-First Century, An Assessment of Availability and Quality. (Washington, D.C.: Government Printing Office, August 1993), table 3.

[45] AFS Interviews, 21 August 1995 - 15 September 1995.

[46] AFS Interviews, 21 August 1995 - 15 September 1995.

that 8 hours of initial on-the-job training and 4 hours of annual recurrent on-the-job training will be required to meet the provisions of § 145.161.

Based on the information above, the estimated cost of 1 hour of initial on-the-job training is $43.18 per trainee ($27.86[47] + (0.5 x $30.64)). This estimate includes 1 hour of lost wages for the trainee and .5 hours of lost wages for the trainer.[48] Annual recurrent on-the-job training for each mechanic employed by a repair station that services general aviation is also estimated to be $43.18 per trainee. These estimates assume that each new-hire mechanic will be required to receive initial on-the-job training and that all mechanics will be required to receive annual recurrent training. Based on a 10 percent attrition rate, approximately 3,000 mechanics will require initial training each year. As a result, the annual cost to the repair station industry for initial on-the-job training will be approximately $1.04 million (8 hrs. x $43.18 x 3,000 mechanics). The annual cost to the repair station industry to implement annual recurrent on-the-job training for each mechanic will be approximately $5.18 million (4 hrs. x $43.18 x 30,000 mechanics). The cost of initial and recurrent training over 13 years is estimated to be $52.85 million or $30.50 million discounted.

3.2.5.2 Records Retention

Final § 145.163(c) will require each repair station to retain the records pertaining to an employee's participation in these training programs for 2 years. This amendment will enhance aviation safety by ensuring that each employee who performs maintenance, preventive

[47] See responses to the comments.
[48] McGraw-Hill's Salary Survey, 1999.

maintenance, or alterations for a repair station is fully capable of performing the work assigned and that documentation of training is available.

Assumption:

Administrative support personnel will spend approximately 6 hours annually filing training records.

The FAA estimates that the cost to each repair station to meet the requirements of final § 145.163(c) will be approximately $71 (6 hours x $11.87). The cost to the repair station industry will be $328,000 annually, $3.94 million total, or $2.44 million discounted.

3.2.6 Manufacturers' Maintenance Facilities

The FAA is deleting current Subpart D of part 145 that will eliminate the "Limited Ratings for Manufacturers." These organizations are known as manufacturers' maintenance facilities (MMFs). Under current provisions, an MMF is permitted to maintain and approve for return to service those articles that the facility has manufactured. This deletion will discontinue the current practice in which the FAA issues, without further showing, a limited rating to: the holder or a licensee of a Type Certificate; a holder of a Production Certificate; the holder of a Technical Standard Order authorization; or any person who meets the requirements of current § 21.303 and has the prescribed Fabrication Inspection System. An MMF that obtains a repair station certificate will be permitted to perform work on articles that the facility has not manufactured.

Based on FAA data, there are 314 MMFs certificated under the authority of part 145.[49] Approximately 25 percent (79) of all MMFs also hold a repair station certificate.[50]

Assumptions:

- The administrative cost of applying for an original repair station certificate is approximately $450 per MMF and includes 10 hours of administrative support personnel time and 10 hours of management personnel time.[51] ((10 hrs. x $11.87) + (10 hrs. x $32.90) = $448)
- The cost to the FAA to approve a single, new or changed, repair station certificate is approximately $1,708 and includes 30 hours of inspector's time (GS-13, level 5), 6 hours of supervisor's time (GS-14, level 5), and 4 hours of administrative support personnel time (GS-7, level 5).[52] ((30 hrs. x $43.80) + (6 hrs. x $51.75) + (4 hrs. x $20.75) = $1,708)

Cost:

MMFs will have to meet the requirements of final part 145 and obtain a repair station certificate if they desire to perform maintenance, preventive maintenance, or alterations. Approximately 314 limited ratings for MMFs are presently issued under current Subpart D of part 145. Seventy-nine of these MMFs are estimated to also possess a repair station certificate. The cost for these

[49] U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular (AC) 140-7I, FAA Certificated Maintenance Agencies Directory, 6 March 1997.

[50] AFS Interviews, 21 August 1995 - 29 August 1995.

[51] This estimate assumes that wage rates for MMF personnel are the same as those for repair station personnel.

[52] AFS Interviews, 31 March 1993 - 21 May 1993.

MMFs to comply with the requirements of final part 145 is equal to the cost of compliance for existing repair stations. Those unit costs have been identified earlier in this evaluation. Based on the information contained in the previous sections, each of the 79 MMFs with repair station certificates will incur the following one-time and annual costs:

- $2,100 to meet repair station manual requirements (weighted average between manual costs for repair stations that currently follow AC145-3 and those that don't: ((810 smaller repair stations x $727) + (190 larger repair stations x $1,455) + (2,936 smaller repair stations x $2,080) + (689 larger repair stations x $4160))/4,625 repair stations = $2,127),
- $1,300 annually to meet personnel training requirements (($1,036,320 initial OJT costs + $5,181,600 annual recurrent OJT costs)/4,625 repair stations = $1,344) and
- $71 annually to meet records retention requirements.

The FAA estimates that each MMF with a repair station certificate will incur one-time costs of approximately $2,100 and annual costs of $1,400 ($1,344 +$71 =$1,415).

The FAA estimates that approximately 231 MMFs do not currently hold a repair station certificate. This evaluation assumes that these MMFs will only have to pay the administrative costs of obtaining a repair station certificate, because they will already have the equipment and facilities needed to manufacture, maintain, or repair an article. The cost of obtaining certification will include the cost of complying with the requirements of final part 145, which are estimated to be $3,500 per repair station, and the additional administrative costs of $450 (see assumptions above) per MMF. The added administrative cost will include the cost of assembling the

documentation necessary to apply for a new repair station certificate. The FAA estimates that the cost for MMFs to obtain a repair station certificate will be approximately $11.43 million over a 13-year period, or $7.14 million discounted.

The estimated cost to the FAA to approve repair station certification for each MMF without a current repair station certificate will be approximately $1,700 (see above assumptions). The one-time cost to the FAA to approve the repair station certification of 314 MMFs will be approximately $536,300, or $468,400 discounted. These costs combined with the costs to MMFs will total $11.97 million or $7.61 million discounted.

3.2.7 Nonquantifiable Benefits

The final rule contains provisions that will assist the aviation industry by ensuring that part 145 is more understandable, easier to use, and consistent with state-of-the-art aviation maintenance practices. The benefits associated with many of these revisions are not quantifiable. These and other nonquantifiable benefits, which are addressed below, may provide cost savings, improve repair station services and capabilities, and improve the clarity of the regulation.

3.2.7.1 Manufacturer Maintenance Facilities

MMFs came about as a way for manufacturers to repair their products under warranty. However, MMFs needed a certificated person such as a repairman to sign return to service and airworthiness releases after products were repaired. The releases were necessary before an air carrier could install and use the repair item.

Although MMFs held limited rating repair station certificates, the FAA believed they needed to comply with the same standards as other repair stations, with respect to procedures, manuals, facilities. So, as discussed in section 3.3.6, the FAA will require MMFs that desire to perform maintenance, preventive maintenance, or alterations to obtain a repair station certificate. The FAA believes that this requirement will provide safety benefits to MMFs and improve the quality of the repairs. The FAA believes that once MMFs obtain their certificates, they will benefit from the overall benefits of the final rule.

3.2.7.2 Capability List

The final rule allows for use of a capability list. The use of this list provides regulatory flexibility because it provides a repair station with a limited rating the option of not having to always change its operations specifications as under the existing rule[53]. Under the final rule, a repair station with a limited rating may use a capability list, and will no longer have to revise its operations specifications each time a new article is added to the list (however, the final rule retains the requirement that a repair station perform a self-evaluation before adding an article to its capability list).

For example, existing § 145.11(a)(4) requires that an applicant for a propeller rating (class 2) prepare a list of each propeller for which the repair station seeks approval. Revisions to the current list require FAA approval, which makes timely revisions cumbersome in the dynamic maintenance marketing environment.

[53] A repair station that performs maintenance, preventive maintenance or alterations on articles must do so in accordance with its operations specifications.

The FAA believes that these repair stations that choose to use a capability list will receive some cost savings. Since the FAA does not know how many repair stations with limited ratings will choose this option or how frequently they will choose this option, it is not possible at this time to quantify the cost savings.

3.2.7.3 Enhanced Services and Capabilities

Satellite Facilities

Final §§ 145.107 will incorporate guidance found in FAA Order 8300.10 by allowing a repair station to obtain a repair station certificate for a satellite facility. This provision will permit independent satellite repair stations to cross-utilize personnel and equipment, thereby enhancing the level of service and the capabilities of repair stations. Since the FAA is unsure at this time how many repair stations would cross-utilize personnel and equipment, it is not possible at this time to quantify the cost savings.

Personnel Requirements

The FAA also is deleting the current requirement in § 145.41 that specifies that a person recommended for certification as a repairman must be employed in a supervisory role. Under final § 145.159, a repair station will be permitted to recommend any employee who meets the eligibility requirements as specified in current § 65.101 for certification as a repairman. This provision will permit additional flexibility in hiring and placement practices. No cost impact or cost-savings is expected.

Line Maintenance

Under current regulations, an operator certificated under part 121 or part 135 may contract line maintenance to a repair station located in the United States, provided that the repair station holds the appropriate ratings and the operator's particular aircraft are identified in that repair station's Operations Specifications.

Many repair stations located at airports have requested that they be permitted to perform line maintenance for part 121 or part 135 operators without meeting all of the class and rating requirements of part 145. Currently, to receive the appropriate ratings or have an operator's aircraft added to the repair station's Operations Specifications, the repair station must meet the current part 145 requirements that exceed those necessary to perform the line maintenance. Final § 145.205(d) will permit a repair station to perform line maintenance functions for an operator without meeting all of the part 145 requirements necessary to obtain either a rating or add an aircraft to the repair station's Operations Specifications. Repair stations could provide this service for operators certificated under part 121 or part 135, or an operator of U.S.-registered aircraft under part 129. A repair station's Operations Specifications will state the job functions performed as line maintenance for each operator. The job functions will be based on the aircraft operator's manual or approved program. Also, the repair station will be required to have the necessary equipment, trained personnel, and technical data to perform the line maintenance. No cost impact or cost-savings is expected.

Contracting

In an effort to harmonize part 145 with Joint Aviation Regulation (JAR) 145, the FAA will continue to permit repair stations to contract out maintenance, preventive maintenance, or alterations, but to permit any repair station to contract out such work on *any* article for which it is rated, provided certain conditions are met.

Current § 145.47(c) states that a repair station may contract maintenance and alteration of a type certificated product to a noncertificated source provided: (1) the repair station is the original manufacturer of the product for which it holds a U.S. type certificate; (2) the contracted component is included as part of the type certificated product; (3) the component maintenance is done by the original component manufacturer or its manufacturing licensee; and (4) before the component is returned to service, the repair station ensures that it is being returned to service in accordance with the repair station's approved quality control system. Under the final rule, contracting to noncertificated sources will no longer be restricted to type certificate holders. Final § 145.217 will permit any repair station to contract maintenance or alteration of any article for which it is approved to another organization provided: (1) the certificated repair station ensures that the noncertificated person follows a quality control system that is equivalent to the system followed by the certificated repair station; (2) the certificated repair station must remain directly in charge of the work performed by the noncertificated person, and (3) the certificated repair station must verify, by test and/or inspection, that the work has been satisfactorily performed by the noncertificated person before approving the article for return to service.

The final rule will require the repair station to maintain a list of functions it will contract out. A repair station that contracts out work to another facility will still be required to inspect the article and to approve the article for return to service (the repair station manual requires procedures for updating the list of contract maintenance functions). The majority of existing repair stations will realize a nonquantifiable benefit because of the potential increase in business as a result of this change, and because of each repair station's ability to contract for certain work to be accomplished by a repair station for less than it will cost the repair station to accomplish the work in house.

3.3 Safety-Related Benefits

The FAA believes that the final rule will enhance aviation safety. The following provisions are expected to be most beneficial to aviation safety:

- Final § 145.211, *Quality control system,*
- Final § 145.163, *Training requirements,*
- Final § 145.207, *Repair station manual.*

Although most of the provisions in the final rules will not specifically prevent maintenance errors, the final rules will constitute a significant update of part 145. Thus, the regulatory package is expected to help avoid or detect maintenance lapses before an aircraft or its components are approved for return to service. Improved training, recordkeeping, and other aspects of the final rule, are key to this expected safety improvement.

It is difficult to determine the number of accidents that result from maintenance problems associated with repair station regulations. However, National Safety Transportation Board (NTSB) data indicate whether the broad category of "maintenance" was a causal or contributing factor in accidents and incidents.

For the approximately 8 1/2 year time period from January 1990 through May 1997, there were 1,148 accidents coded by the NTSB in which maintenance was considered a causal or contributing factor. A subset containing 630 of these accidents was reviewed by the FAA. This subset consisted of accidents in which the "narrative" or "probable cause" sections contained the word "maintenance". Maintenance was also coded as a causal or contributing factor by the NTSB.

The FAA determined that of these 630 accidents, there were 321 in which the maintenance could have been associated with repair station maintenance. Recognizing that the accident data reviewed is somewhat limited in scope and detail, the FAA excluded 309 accidents (630 - 321 = 309) related to company- or pilot-performed maintenance, or operator. Therefore, the possibility exists that the remaining maintenance-related accidents may have involved repair station maintenance. In the regulatory evaluation for the NPRM, the FAA postulated that the revisions to part 145 may reduce the number of accidents by 5 to 10 percent. The FAA sought public comment on the use of these effectiveness estimates and whether they should be any different, however, no specific comments were received.

As shown in Tables B1 through B4 most of the potentially preventable accidents from the sample of 630 involve part 91 aircraft. Some part 135 and part 137 accidents will also have been potentially preventable. These tables also show the number and value of fatalities, serious injuries, minor injuries, substantially damaged aircraft and destroyed aircraft for the 8 1/2 year period from 1990 through May 1997. Based on this historical data, an average of 12 fatalities, 9 serious injuries and 15 minor injuries occur each year; 29 aircraft are destroyed; and 9 aircraft are substantially damaged due to accidents in which maintenance could be attributed to repair station activities as a causal or contributing factor.

The FAA did not review 518 accident records (1,148 - 630 = 518) because the word "maintenance" was not in the write-up. However, the FAA reviewed 50 of the remaining 518 to see if they were any different from the 630 that were reviewed. The FAA found no substantial difference to suggest that the group of 518 that were not reviewed was any different from the 630 that were reviewed. As stated above, 1,148 accidents that actually occurred during the time period 1990 through May 1997. Because the 630 accidents that were reviewed accounted for only 55 percent (630/1148 = 54.9%) of the total that occurred, the FAA concludes that as many as 585 accidents (321/0.549) could have been potentially prevented due to repair station maintenance over the same time period. Tables B3 and B4 show that, an average of 22 fatalities, 17 serious injuries and 27 minor injuries occur each year; 53 aircraft are destroyed; and 16 aircraft are substantially damaged due to accidents in which maintenance could be attributed to repair station activities as a causal or contributing factor.

The FAA estimated monetary losses due to aircraft damage and investigation costs based on the information in Table 3, Unit Cost Estimates (current dollars). The monetary values for injuries are based on the avoidance of these injuries in the future.

If the revision to part 145 enhances safety by reducing the number of accidents by 10 percent, an average of 6.9 accidents (6.88 accidents) will be avoided annually, preventing 2.2 fatalities, 1.7 serious injuries, and 2.7 minor injuries. The FAA estimates that the benefits associated with avoided fatalities and injuries will be approximately $76.96 million total, or $49.24 million discounted.

Based on the above accident analysis, the avoidance of 6.9 accidents will avert at a minimum the destruction of at least 4.69 general aviation aircraft, and will avert substantial damage to 1.37 general aviation aircraft annually. The FAA estimates that the benefit associated with avoiding the destruction or damage of aircraft affected by this rulemaking (including NTSB and FAA accident investigation costs) will be approximately $12,028,900 total, or $7,697,000 discounted.

In total, the FAA concludes that if the rule as proposed was not changed, the undiscounted quantifiable safety benefits will be $89.0 million or $56.9 million discounted in current dollars. However, there were significant changes made to the final rule (compared to the proposal) that are difficult to quantify. Therefore, instead of estimating that the revisions to the final rule might reduce the number of accidents by 5 to 10 percent, the FAA has decided to, based on the costs of

the final rule, calculate what the reduction in accidents needs to be in order to equate the discounted costs to the discounted benefits.

Using the estimates derived above, if the benefits in the final rule were one-half of the estimate shown in the initial regulatory evaluation, then the final rule would reduce the current number of accidents by between 2 ½ to 5 percent and the discounted benefits of the final rule would be $28,470,800 in current dollars. If the benefits were one-fourth of the estimate shown in the initial regulatory evaluation, then the final rule would reduce the current number of accidents by between 1 ¼ and 2 ½ percent and the discounted benefits of the final rule would be $14,235,400 in current dollars. The switch point or when discounted benefits equate to discounted costs is between 25 percent and 50 percent.

3.4 Comparison of Benefits and Costs

The revisions to part 145 offer benefits to the aviation industry in terms of reduced costs and improved safety. Many of these benefits are not quantifiable. Based upon information from PAI and new information from the public comments to the docket, the FAA identified benefits that provide unquantifiable cost savings, improve repair station services and capabilities, and improve the clarity of the regulation.

The estimated net cost of compliance after subtracting cost savings with the final amendment will be $22.2 million (net of cost savings) in current dollars, discounted at 7 percent, over 13 years. The most costly requirement, section 145.163, Training Requirements, will result in repair stations incurring discounted costs of $30.5 million. The most cost-saving requirement, the

Manufacturer's Service Manual, will result in repair stations saving between $22.8 and $45.5 million discounted.

The estimated quantifiable safety benefits, being difficult to quantify, are calculated based on what the reduction in accidents needs to be in order to equate the discount costs to the discounted safety benefits. On an annual basis, an average of 3.4 total accidents (3.44 accidents) will be avoided, preventing 1.1 fatalities, 0.8 serious injuries, and 1.4 minor injuries. The quantifiable safety benefits of the final amendment will be approximately, $28.5 million in current dollars discounted at 7 percent, over 13 years. The avoidance of these 3.4 accidents will also avert at a minimum the destruction of at least 2.4 general aviation aircraft and will avert the substantial damage of 0.7 general aviation aircraft. Property damage to other types of aircraft will also be averted.

Tables 2 and 3 below identify the quantifiable benefits and costs associated with this final rulemaking. Tables A1 through A3 of the appendix identify the quantifiable costs and cost savings that are incurred by the repair station industry and the FAA. Table B1 through B6 in the appendix contains a more detailed summary of quantifiable benefits. Table C1 provides an assessment of the impact of the rule on small entities.

TABLE 2. Summary of Quantifiable Benefits of Final Part 145 (Current dollars)

Section	Description	13-Year Discounted Benefits
Part 145	13-Year Total Discounted Benefits (as shown in initial regulatory evaluation to the proposed rule).	$56,941,700
Part 145	One-Half of the Total Discounted Benefits (13 years).	$28,470,800
Part 145	One-Fourth of the Total Discounted Benefits (13 years).	$14,235,400

TABLE 3. Summary of Quantifiable Costs and Cost Savings of Final Part 145 (Current dollars)

Section	Description	13-Year Discounted Costs
N/A	Manufacturers' Maintenance Facilities	$7,608,500
N/A	FAA Training	$101,045
145.159	Records of management, supervisory, and inspection personnel	$2,437,600
145.161	Training requirements	$30,498,500
145.207 and 145.209	Repair station manual (cost)	$8,578,100
145.207 and 145.209	Repair station manual (cost savings)	Between ($4,308,100) and ($9,219,400)
N/A	Manufacturer's Service Manuals (cost savings)	Between ($22,771,400) and ($45,542,900)
13-Year Total Discounted Cost (7 percent):		$22,159,200

4.0 REGULATORY FLEXIBILITY DETERMINATION

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions. Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605 (b) of the 1980 act provides that the head of the agency may so certify and a RFA is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

In many cases, the Small Business Administration suggests that "small" represents the impacted entities with an annual revenue of $5 million or less. For this final rule, a small entity group is defined as aircraft servicing and repairing, except on a factory basis (Standard Industrial Classification Code 4581). At present, it is difficult for the FAA to determine exactly how many

of these repair stations have an annual revenue of $5 million or less but believes that the number is probably large. The FAA found a minimum of 19 repair stations in the World Aviation Directory that meet this definition[54].

For each of these entities the FAA attempted to find the annual sales from World Aviation Directory 1998, the Net Present Value of Costs, and annualized costs. After calculating the annualized costs accounting for firm size using the same assumptions that were used in the cost section, the FAA then compared the annualized costs with annual sales.

As stated earlier, a minimum of 19 repair stations meet this standard. For the smallest entity listed in Table C1 of the Appendix, one company with three employees had sales of $500,000 and another company with 9 employees had sales of $300,000. The annualized cost of the final rule is very small in comparison to annual sales of the affected entities – considerably less than 1 percent of their sales. At most, the final rule will impose an annualized cost on one small entity that is approximately 0.1 percent of its annual sales. Therefore, the FAA does not consider the costs imposed by this final rule to have a significant impact on a substantial number of small entities.

Furthermore, the FAA has rewritten several provisions that provide regulatory flexibility, especially for small entities. Two of these provisions relate to capability lists and repair station manuals. In addition, one set of provisions on quality assurance has been deleted from the final rule because of the disproportionate impact on small entities. The following discussion addresses each of these three subjects.

[54] World Aviation Directory. Winter 1998 (Valid through March 1999)

Capability list

The final rule allows for use of a capability list. The use of this list provides regulatory flexibility because it provides repair stations with a limited rating the option of not having to always change its operations specifications under the existing rule--a repair station that performs maintenance, preventive maintenance or alterations of articles must do so in accordance with its operations specifications. Under the final rule, a repair station with a limited rating may use a capability list, and will no longer have to revise its operations specifications each time a new article is added to the list (however, the final rule retains the requirement that a repair station perform a self-evaluation before adding an article to its capability list).

For example, existing § 145.11(a)(4) requires that an applicant for a propeller rating (class 2) prepares a list of each propeller for which the repair station seeks approval. Revisions to the current list require FAA approval, which makes timely revisions cumbersome in the dynamic maintenance marketing environment.

The FAA believes that these repair stations that choose to use a capability list will incur cost savings. Since the FAA does not know how many repair stations with limited ratings will choose this option or how frequently they will choose this option, it is not possible at this time to quantify the cost savings.

Repair Station Manuals

Based on FAA statistics and information provided by industry that was used in the preliminary regulatory evaluation, repair stations are estimated to employ approximately 12,877 supervisors and at least 13,444 inspectors. These repair stations must maintain approximately 26,321 IPMs. Because of the complexity of many repair stations' operations, the repair stations should document additional aspects of their operations not covered in the current IPM. Therefore, the FAA will eliminate the requirements that repair stations maintain an IPM and replace it with a requirement that repair stations maintain an acceptable quality control manual and require the repair station to maintain a repair station manual to document operational procedures. Also, the current requirement for all repair stations' supervisory and inspection personnel to each have a copy of the manual has been withdrawn. In the final rule, only 4,625 repair station manuals will be required to be maintained, so the total number of required manuals will be reduced by 21,696. Final § 145.207 will require only that the repair station manual be accessible for use by repair station personnel. Furthermore, since smaller repair stations do not perform as complex operations as do larger repair stations (due to the number of employees, duties, and responsibilities), the cost for the smaller repair station to revise their IPM and to meet the requirements of final § 145.209 is approximately half that of a larger repair station.

Deletion of Quality Assurance

Proposed § 145.201 required each repair station to establish and maintain a quality assurance system acceptable to the Administrator. The FAA estimated that repair stations were going to incur a total one-time cost of approximately $1,471,400 and annual costs of approximately $12,123,200 on this quality assurance system. However, for the final rule, the FAA withdrew this requirement and, therefore, no cost will be incurred by these repair stations for the quality assurance system. Based upon public comments to the docket, this requirement would have had a disproportionate impact on smaller entities. As stated in the Preamble, the FAA has removed the quality assurance requirements from the final rule and any references to it have been removed from the manual requirements. The FAA intends to issue a subsequent NPRM that will address this issue.

The FAA has determined that this final rule will not have a significant economic impact on a substantial number of small entities. Accordingly, pursuant to the Regulatory Flexibility Act, 5 U.S.C. 605 (b), the Federal Aviation Administration certifies that this rule will not have a significant economic impact on a substantial number of small entities.

5.0 INTERNATIONAL TRADE IMPACT ANALYSIS

The Trade Agreement Act of 1979 prohibits Federal agencies from engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and where appropriate, that they be the basis for U.S. standards. In addition, consistent with the Administration's belief in the

general superiority and desirability of free trade, it is the policy of the Administration to remove or diminish to the extent feasible, barriers to international trade, including both barriers affecting the export of American goods and services to foreign countries and barriers affecting the import of foreign goods and services into the United States.

The final rule is not expected to affect trade opportunities for U.S. firms doing business overseas or for foreign firms doing business in the United States. Furthermore, the final rule is consistent with the terms of several trade agreements to which the United States is a signatory, such as the Trade Agreement Act of 1979 (19 U.S.C. 2501 et seq.), incorporating the Agreement on Trade in Civil Aircraft (31 U.S.T. 619) and the Agreement on Technical Barriers to Trade (Standards) (19 U.S.C. 2531). The revision to part 145 is also consistent with 49 U.S.C. 40105, formerly 1102 (a) of the Federal Aviation Act of 1958, as amended, which requires the FAA to exercise and perform its powers and duties consistently with any obligation assumed by the United States in any agreement that may be in force between the United States and any foreign country or countries.

6.0 UNFUNDED MANDATES REFORM ACT ASSESSMENT

The Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995, is intended, among other things, to curb the practice of imposing unfunded Federal mandates on State, local, and tribal governments.

Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in a $100 million or more expenditure (adjusted annually for inflation) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action.

This final rule does not meet the cost thresholds described above. Furthermore, this final rule will not impose a significant cost or uniquely affect small governments. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

APPENDIX

Table A1. Summary of Quantifiable Costs and Cost Savings Associated with the Final Rule to the Repair Station Industry (2000 Dollars)

Discount Period	MMF	Repair Station Manual	Training Program	Records Retention	Manufacturer's Service Manuals (range*)		Repair Station Manual (range*)		Total (range)	
1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2	$1,201,508	$9,837,804	$0	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$7,719,660	$4,071,633
3	$929,987	$0	$0	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	($2,389,665)	($6,037,692)
4	$929,987	$0	$6,217,920	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$3,828,255	$180,228
5	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
6	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
7	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
8	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
9	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
10	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
11	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
12	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
13	$929,987	$0	$5,181,600	$328,375	($3,067,659)	($6,135,318)	($580,368)	($1,160,736)	$2,791,935	($856,092)
Total	$11,431,365	$9,837,804	$52,852,320	$3,940,500	($36,811,906)	($73,623,812)	($6,964,416)	($13,928,832)	$34,285,667	($9,490,655)

* The FAA believes that the range from 25 to 50 percent (applied to the cost savings) covers the full extent of possible outcomes.

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table A2. Summary of Quantifiable Discounted Costs and Cost Savings to the Repair Industry Associated with the Final Rule (2000 Dollars)

Discount Period	MMF	Repair Station Manual	Training Program	Records Retention	Manufacturer's Service Manuals (range*)		Repair Station Manual (range*)		Total (range)	
1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2	$1,049,444	$8,592,722	$0	$286,816	($2,679,413)	($5,358,826)	($506,916)	($1,013,832)	$6,742,652	$3,556,323
3	$759,147	$0	$0	$268,052	($2,504,124)	($5,008,248)	($473,753)	($947,506)	($1,950,679)	($4,928,556)
4	$709,482	$0	$4,743,620	$250,516	($2,340,302)	($4,680,603)	($442,760)	($885,520)	$2,920,557	$137,495
5	$663,068	$0	$3,694,408	$234,127	($2,187,198)	($4,374,396)	($413,794)	($827,589)	$1,990,611	($610,381)
6	$619,689	$0	$3,452,718	$218,810	($2,044,110)	($4,088,220)	($386,724)	($773,447)	$1,860,384	($570,450)
7	$579,149	$0	$3,226,841	$204,496	($1,910,385)	($3,820,769)	($361,424)	($722,848)	$1,738,678	($533,131)
8	$541,261	$0	$3,015,738	$191,117	($1,785,405)	($3,570,810)	($337,779)	($675,559)	$1,624,931	($498,253)
9	$505,852	$0	$2,818,448	$178,614	($1,668,604)	($3,337,208)	($315,682)	($631,364)	$1,518,628	($465,657)
10	$472,758	$0	$2,634,061	$166,929	($1,559,441)	($3,118,883)	($295,029)	($590,059)	$1,419,277	($435,193)
11	$441,830	$0	$2,461,742	$156,009	($1,457,423)	($2,914,846)	($275,729)	($551,458)	$1,326,429	($406,723)
12	$412,925	$0	$2,300,693	$145,802	($1,362,077)	($2,724,155)	($257,690)	($515,381)	$1,239,653	($380,115)
13	$385,911	$0	$2,150,177	$136,264	($1,272,968)	($2,545,936)	($240,832)	($481,664)	$1,158,553	($355,247)
Total	$7,140,517	$8,592,722	$30,498,447	$2,437,551	($22,771,449)	($45,542,898)	($4,308,113)	($8,616,226)	$21,589,674	($5,489,888)

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

* The FAA believes that the range from 25 to 50 percent (applied to the cost savings) covers the full extent of possible outcomes.

Table A3. Summary of Undiscounted and Discounted Costs (Discounted at 7 percent) to The FAA Associated With the Proposed Rule on Repair Stations (2000 Dollars)				
Discount Period	FAA Training & Advisory/Guidance Material	MMF	Discount Factor	Discounted Total
1	$0	$0	0.934579	$0
2	$115,686	$536,312	0.873439	$569,480
3	$0	$0	0.816298	$0
4	$0	$0	0.762895	$0
5	$0	$0	0.712986	$0
6	$0	$0	0.666342	$0
7	$0	$0	0.622750	$0
8	$0	$0	0.582009	$0
9	$0	$0	0.543934	$0
10	$0	$0	0.508349	$0
11	$0	$0	0.475093	$0
12	$0	$0	0.444012	$0
13	$0	$0	0.414964	$0
Total	$115,686	$536,312		$569,480

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table B1. Estimated Safety Benefits By Part and By Effectiveness Associated With The Proposed Rule on Repair Stations, 2000 Dollars*							
		Total Potentially Preventable Accidents	Number of Serious Injuries	Number of Minor Injuries	Number of Fatalities	Number of Destroyed Aircraft	Number of Substantially Damaged Aircraft
Part 91	Total	283	67.00	107.00	93.00	219.00	64.00
	Average/Year		7.88	12.59	10.94	25.76	7.53
	Avg/Yr (5% Effectiveness)		0.39	0.63	0.55	1.29	0.38
	Avg/Yr (10% Effectiveness)		0.79	1.26	1.09	2.58	0.75
Part 121	Total	3	1.00	8.00	0.00	3.00	0.00
	Average/Year		0.12	0.94	0.00	0.35	0.00
	Avg/Yr (5% Effectiveness)		0.01	0.05	0.00	0.02	0.00
	Avg/Yr (10% Effectiveness)		0.01	0.09	0.00	0.04	0.00
Part 135	Total	13	8.00	7.00	9.00	8.00	5.00
	Average/Year		0.94	0.82	1.06	0.94	0.59
	Avg/Yr (5% Effectiveness)		0.05	0.04	0.05	0.05	0.03
	Avg/Yr (10% Effectiveness)		0.09	0.08	0.11	0.09	0.06
Part 137	Total	20	2.00	2.00	0.00	16.00	4.00
	Average/Year		0.24	0.24	0.00	1.88	0.47
	Avg/Yr (5% Effectiveness)		0.01	0.01	0.00	0.09	0.02
	Avg/Yr (10% Effectiveness)		0.02	0.02	0.00	0.19	0.05
Part 133	Total	2	0.00	2.00	2.00	1.00	1.00
	Average/Year		0.00	0.24	0.24	0.12	0.12
	Avg/Yr (5% Effectiveness)		0.00	0.01	0.01	0.01	0.01
	Avg/Yr (10% Effectiveness)		0.00	0.02	0.02	0.01	0.01
All Parts	Total	321	78.00	126.00	104.00	247.00	74.00
	Average/Year		9.18	14.82	12.24	29.06	8.71
	Avg/Yr (5% Effectiveness)		0.46	0.74	0.61	1.45	0.44
	Avg/Yr (10% Effectiveness)		0.92	1.48	1.22	2.91	0.87

* Based on the 8 1/2 year period from 1990 to May 1997. The proposed rule, which is different from the final rule, is based on the Notice of Proposed Rulemaking No. 99.09 "Part 145 Review: Repair Stations" (64 FR 33142, June 21, 1999).

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table B2. Value of Estimated Safety Benefits By Part and By Effectiveness Associated With The Proposed Rule on Repair Stations, 2000 Dollars*								
		Total Potentially Preventable Accidents	Value of Serious Injuries	Value of Minor Injuries	Value of Fatalities	Value of Destroyed Aircraft	Value of Substantially Damaged Aircraft	Total
Part 91	Total	283	$34,960,600	$4,119,500	$251,100,000	$10,451,994	$1,555,200	$302,187,294
	Average/Year		$4,113,012	$484,647	$29,541,176	$1,229,646	$182,965	$35,551,446
	Avg/Yr (5% Effectiveness)		$205,651	$24,232	$1,477,059	$61,482	$9,148	$1,777,572
	Avg/Yr (10% Effectiveness)		$411,301	$48,465	$2,954,118	$122,965	$18,296	$3,555,145
Part 121	Total	3	$521,800	$308,000	$0	$36,507,900	$0	$37,337,700
	Average/Year		$61,388	$36,235	$0	$4,295,047	$0	$4,392,671
	Avg/Yr (5% Effectiveness)		$3,069	$1,812	$0	$214,752	$0	$219,634
	Avg/Yr (10% Effectiveness)		$6,139	$3,624	$0	$429,505	$0	$439,267
Part 135	Total	13	$4,174,400	$269,500	$24,300,000	$381,808	$121,500	$29,247,208
	Average/Year		$491,106	$31,706	$2,858,824	$44,919	$14,294	$3,440,848
	Avg/Yr (5% Effectiveness)		$24,555	$1,585	$142,941	$2,246	$715	$172,042
	Avg/Yr (10% Effectiveness)		$49,111	$3,171	$285,882	$4,492	$1,429	$344,085
Part 137	Total	20	$1,043,600	$77,000	$0	$763,616	$97,200	$1,981,416
	Average/Year		$122,776	$9,059	$0	$89,837	$11,435	$233,108
	Avg/Yr (5% Effectiveness)		$6,139	$453	$0	$4,492	$572	$11,655
	Avg/Yr (10% Effectiveness)		$12,278	$906	$0	$8,984	$1,144	$23,311
Part 133	Total	2	$0	$77,000	$5,400,000	$966,342	$163,806	$6,607,148
	Average/Year		$0	$9,059	$635,294	$113,687	$19,271	$777,312
	Avg/Yr (5% Effectiveness)		$0	$453	$31,765	$5,684	$964	$38,866
	Avg/Yr (10% Effectiveness)		$0	$906	$63,529	$11,369	$1,927	$77,731
All Parts	Total	321	$40,700,400	$4,851,000	$280,800,000	$49,071,660	$1,937,706	$377,360,766
	Average/Year		$4,788,282	$570,706	$33,035,294	$5,773,136	$227,965	$44,395,384
	Avg/Yr (5% Effectiveness)		$239,414	$28,535	$1,651,765	$288,657	$11,398	$2,219,769
	Avg/Yr (10% Effectiveness)		$478,828	$57,071	$3,303,529	$577,314	$22,797	$4,439,538

* Based on the 8 1/2 year period from 1990 to May 1997. The proposed rule, which is different from the final rule, is based on the Notice of Proposed Rulemaking No. 99.09 "Part 145 Review: Repair Stations" (64 FR 33142, June 21, 1999).

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table B3. Estimated Safety Benefits By Part and By Effectiveness Associated With The Proposed Rule on Repair Stations, 2000 Dollars (After Extrapolating to the Industry)*

		Total Potentially Preventable Accidents	Number of Serious Injuries	Number of Minor Injuries	Number of Fatalities	Number of Destroyed Aircraft	Number of Substantially Damaged Aircraft
Part 91	Total	516	122.09	194.98	169.47	399.07	116.62
	Average/Year		14.36	22.94	19.94	46.95	13.72
	Avg/Yr (5% Effectiveness)		0.72	1.15	1.00	2.35	0.69
	Avg/Yr (10% Effectiveness)		1.44	2.29	1.99	4.69	1.37
Part 121	Total	5	1.82	14.58	0.00	5.47	0.00
	Average/Year		0.21	1.72	0.00	0.64	0.00
	Avg/Yr (5% Effectiveness)		0.01	0.09	0.00	0.03	0.00
	Avg/Yr (10% Effectiveness)		0.02	0.17	0.00	0.06	0.00
Part 135	Total	24	14.58	12.76	16.40	14.58	9.11
	Average/Year		1.72	1.50	1.93	1.72	1.07
	Avg/Yr (5% Effectiveness)		0.09	0.08	0.10	0.09	0.05
	Avg/Yr (10% Effectiveness)		0.17	0.15	0.19	0.17	0.11
Part 137	Total	36	3.64	3.64	0.00	29.16	7.29
	Average/Year		0.43	0.43	0.00	3.43	0.86
	Avg/Yr (5% Effectiveness)		0.02	0.02	0.00	0.17	0.04
	Avg/Yr (10% Effectiveness)		0.04	0.04	0.00	0.34	0.09
Part 133	Total	4	0.00	3.64	3.64	1.82	1.82
	Average/Year		0.00	0.43	0.43	0.21	0.21
	Avg/Yr (5% Effectiveness)		0.00	0.02	0.02	0.01	0.01
	Avg/Yr (10% Effectiveness)		0.00	0.04	0.04	0.02	0.02
All Parts	Total	585	142.13	229.60	189.51	450.09	134.84
	Average/Year		16.72	27.01	22.30	52.95	15.86
	Avg/Yr (5% Effectiveness)		0.84	1.35	1.11	2.65	0.79
	Avg/Yr (10% Effectiveness)		1.67	2.70	2.23	5.30	1.59

* Based on the 8 1/2 year period from 1990 to May 1997. The proposed rule, which is different from the final rule, is based on the Notice of Proposed Rulemaking No. 99.09 "Part 145 Review: Repair Stations" (64 FR 33142, June 21, 1999).

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table B4. Estimated Safety Benefits By Part and By Effectiveness associated With the Proposed Rule on Repair Stations, 2000 Dollars (After Extrapolating to the Industry)*

		Total Potentially Preventable Accidents	Value of Serious Injuries	Value of Minor Injuries	Value of Fatalities	Value of Destroyed Aircraft	Value of Substantially Damaged Aircraft	Total
Part 91	Total	516	$63,705,982	$7,506,644	$457,560,000	$19,045,856	$2,833,920	$550,652,402
	Average/Year		$7,494,821	$883,135	$53,830,588	$2,240,689	$333,402	$64,782,636
	Avg/Yr (5% Effectiveness)		$374,741	$44,157	$2,691,529	$112,034	$16,670	$3,239,132
	Avg/Yr (10% Effectiveness)		$749,482	$88,313	$5,383,059	$224,069	$33,340	$6,478,264
Part 121	Total	5	$950,836	$561,244	$0	$66,525,507	$0	$68,037,587
	Average/Year		$111,863	$66,029	$0	$7,826,530	$0	$8,004,422
	Avg/Yr (5% Effectiveness)		$5,593	$3,301	$0	$391,327	$0	$400,221
	Avg/Yr (10% Effectiveness)		$11,186	$6,603	$0	$782,653	$0	$800,442
Part 135	Total	24	$7,606,684	$491,089	$44,280,000	$695,739	$221,400	$53,294,912
	Average/Year		$894,904	$57,775	$5,209,412	$81,852	$26,047	$6,269,990
	Avg/Yr (5% Effectiveness)		$44,745	$2,889	$260,471	$4,093	$1,302	$313,499
	Avg/Yr (10% Effectiveness)		$89,490	$5,778	$520,941	$8,185	$2,605	$626,999
Part 137	Total	36	$1,901,671	$140,311	$0	$1,391,478	$177,120	$3,610,580
	Average/Year		$223,726	$16,507	$0	$163,703	$20,838	$424,774
	Avg/Yr (5% Effectiveness)		$11,186	$825	$0	$8,185	$1,042	$21,239
	Avg/Yr (10% Effectiveness)		$22,373	$1,651	$0	$16,370	$2,084	$42,477
Part 133	Total	4	$0	$140,311	$9,840,000	$1,760,890	$298,491	$12,039,692
	Average/Year		$0	$16,507	$1,157,647	$207,164	$35,117	$1,416,434
	Avg/Yr (5% Effectiveness)		$0	$825	$57,882	$10,358	$1,756	$70,822
	Avg/Yr (10% Effectiveness)		$0	$1,651	$115,765	$20,716	$3,512	$141,643
All Parts	Total	585	$74,165,173	$8,839,600	$511,680,000	$89,419,469	$3,530,931	$687,635,174
	Average/Year		$8,725,315	$1,039,953	$60,197,647	$10,519,938	$415,404	$80,898,256
	Avg/Yr (5% Effectiveness)		$436,266	$51,998	$3,009,882	$525,997	$20,770	$4,044,913
	Avg/Yr (10% Effectiveness)		$872,531	$103,995	$6,019,765	$1,051,994	$41,540	$8,089,826

* Based on the 8 1/2 year period from 1990 to May 1997.

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table B5. Summary of Undiscounted Quantifiable Safety Benefits (2000 Dollars)***							
Discount period	Parts 91, 133, and 137 aircraft damaged and destroyed	Part 121 aircraft damaged and destroyed	Part 135 aircraft damaged and destroyed	Fatalities	Serious Injuries	Minor Injuries	Total
1	$0	$0	$0	$0	$0	$0	$0
2	$150,046	$391,327	$5,395	$3,009,883	$436,266	$51,998	$4,044,913
3	$150,046	$391,327	$5,395	$3,009,883	$436,266	$51,998	$4,044,913
4	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
5	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
6	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
7	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
8	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
9	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
10	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
11	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
12	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
13	$300,091	$782,653	$10,790	$6,019,765	$872,531	$103,995	$8,089,825
Total Benefits	$3,301,001	$8,609,183	$118,690	$66,217,415	$9,597,841	$1,143,945	$88,988,075
Benefits equal to 50 % of proposed rule**	$1,650,501	$4,304,592	$59,345	$33,108,708	$4,798,921	$571,973	$44,494,038
Benefits equal to 25 % of proposed rule	$825,250	$2,152,296	$29,673	$16,554,354	$2,399,460	$285,986	$22,247,019

* Based on the 8 1/2 year period from 1990 to May 1997.

** The switch point or when discounted benefits equate to discounted costs is between 25 percent and 50 percent.

*** It is difficult to determine exactly when the benefits will start accruing, but since some of the provisions will not be in place until the fourth year, the FAA has assumed that only half of the anticipated annual benefits will occur in years 2 and 3.

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table B6. Summary of Quantifiable Safety Benefits Discounted at 7 Percent (2000 Dollars)***							
Discount period	Parts 91, 133, and 137 aircraft damaged and destroyed	Part 121 aircraft damaged and destroyed	Part 135 aircraft damaged and destroyed	Fatalities	Serious Injuries	Minor Injuries	Total
1	$0	$0	$0	$0	$0	$0	$0
2	$140,229	$365,726	$5,042	$2,812,973	$407,725	$48,596	$3,780,290
3	$131,056	$341,800	$4,712	$2,628,949	$381,051	$45,417	$3,532,984
4	$244,964	$638,878	$8,808	$4,913,922	$712,245	$84,891	$6,603,708
5	$228,938	$597,082	$8,232	$4,592,449	$665,650	$79,337	$6,171,687
6	$213,961	$558,021	$7,693	$4,292,008	$622,102	$74,147	$5,767,932
7	$199,963	$521,515	$7,190	$4,011,222	$581,404	$69,296	$5,390,590
8	$186,882	$487,397	$6,719	$3,748,809	$543,369	$64,763	$5,037,939
9	$174,656	$455,511	$6,280	$3,503,557	$507,821	$60,526	$4,708,351
10	$163,230	$425,712	$5,869	$3,274,355	$474,599	$56,566	$4,400,331
11	$152,551	$397,861	$5,485	$3,060,142	$443,550	$52,866	$4,112,454
12	$142,571	$371,833	$5,126	$2,859,948	$414,533	$49,407	$3,843,419
13	$133,244	$347,507	$4,791	$2,672,848	$387,414	$46,175	$3,591,979
Total Benefits of Proposed Rule	$2,112,244	$5,508,842	$75,947	$42,371,181	$6,141,464	$731,987	$56,941,665
Benefits equal to 50 % of proposed rule**	$1,056,122	$2,754,421	$37,974	$21,185,591	$3,070,732	$365,994	$28,470,833
Benefits equal to 25 % of proposed rule	$528,061	$1,377,210	$18,987	$10,592,795	$1,535,366	$182,997	$14,235,416

* Based on the 8 1/2 year period from 1990 to May 1997.

** The switch point or when discounted benefits equate to discounted costs is between 25 percent and 50 percent.

*** It is difficult to determine exactly when the benefits will start accruing, but since some of the provisions will not be in place until the fourth year, the FAA has assumed that only half of the anticipated annual benefits will occur in years 2 and 3.

Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000.

Table C1. Flexibility Analysis (2000 Dollars)*						
Repair station	Annual Sales**	Total Costs over 13 years***	Capital recovery factor	Annualized Cost	Annualized Cost as a % of Annual revenue	Sig / Not Sig
1	$750,000	$12,826	0.11965	$1,535	0.20%	Not Sig
2	$2,900,000	$37,490	0.11965	$4,486	0.15%	Not Sig
3	$2,000,000	$18,698	0.11965	$2,237	0.11%	Not Sig
4	$500,000	$5,779	0.11965	$691	0.14%	Not Sig
5	$4,000,000	$43,363	0.11965	$5,188	0.13%	Not Sig
6	$2,000,000	$25,745	0.11965	$3,080	0.15%	Not Sig
7	$5,000,000	$24,571	0.11965	$2,940	0.06%	Not Sig
8	$4,100,000	$25,745	0.11965	$3,080	0.08%	Not Sig
9	$3,000,000	$28,094	0.11965	$3,361	0.11%	Not Sig
10	$2,000,000	$25,745	0.11965	$3,080	0.15%	Not Sig
11	$3,000,000	$28,094	0.11965	$3,361	0.11%	Not Sig
12	$650,000	$15,175	0.11965	$1,816	0.28%	Not Sig
13	$2,000,000	$9,302	0.11965	$1,113	0.06%	Not Sig
14	$5,000,000	$66,853	0.11965	$7,999	0.16%	Not Sig
15	$800,000	$12,826	0.11965	$1,535	0.19%	Not Sig
16	$780,000	$19,873	0.11965	$2,378	0.30%	Not Sig
17	$300,000	$12,826	0.11965	$1,535	0.51%	Not Sig
18	$2,000,000	$84,470	0.11965	$10,107	0.51%	Not Sig
19	$1,500,000	$9,302	0.11965	$1,113	0.07%	Not Sig

* Source: U.S. Department of Transportation, Federal Aviation Administration, Operations Regulatory Analysis Branch. December 2000, except for annual sales.

** Source for annual sales: World Aviation Directory. Winter 1998 (Valid through March 1999).

*** Total Costs include the repair station manual, recordkeeping, and the training program. The FAA does not know how many mechanics and/or repairmen at these 19 repair stations will participate in the training program. For purposes of this analysis, the FAA has assumed that approximately 66.7 percent of the current employees will participate in recurrent training. In addition, 6.7 percent (based on 10 percent attrition) will participate in initial training.

REGULATORY EVALUATION SUMMARY
FOR INSERTION IN THE PREAMBLE

Changes to Federal Regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act requires agencies to analyze the economic effect of regulatory changes on small businesses and other small entities. Third, the Office of Management and Budget directs agencies to assess the effect of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this proposed rule: (1) will generate benefits that justify its costs and is not a "significant regulatory action" as defined in the Executive Order; (2) is not significant as defined in the Department of Transportation's Regulatory Policies and Procedures; (3) will not have a significant impact on a substantial number of small entities; (4) will not constitute a barrier to international trade; and (5) will not contain any Federal intergovernmental or private sector mandate. These analyses are summarized here in the preamble, and the full Regulatory Evaluation is in the docket.

The Federal Aviation Administration (FAA) is updating and revising the regulations for part 145 repair stations. The final rule is necessary because many of the current repair station regulations do not reflect changes in repair station business practices, advancements in technology, and aircraft maintenance practices. The benefits and costs have been calculated for 13 years.

The estimated quantifiable safety benefits, being difficult to quantify, are calculated based on what the reduction in accidents needs to be in order to equate the discount costs to the discounted safety benefits. If the safety benefits are half of those discussed in the initial regulatory evaluation (6.9 total accidents will be avoided, preventing 2.2 fatalities, 1.7 serious injuries, and 2.7 minor injuries), then the quantifiable safety benefits of the final amendment will be approximately, $28.5 million in 2000 dollars discounted at 7 percent, over 13 years. On an annual basis (assuming that quantifiable benefits are only one-half of those estimated in the initial regulatory evaluation) an average of 3.4 total accidents will be avoided, preventing 1.1 fatalities, 0.8 serious injuries, and 1.4 minor injuries. The avoidance of 3.4 accidents will avert at a minimum the destruction of at least 2.4 general aviation aircraft and will avert the substantial damage of 0.7 general aviation aircraft. Property damage to other types of aircraft will also be averted.

The estimated net cost of compliance after subtracting cost savings with the final amendment will be $22.2 million (net of cost savings) in current dollars, discounted at 7 percent, over 13 years. The most costly requirement, section 145.161, Training Requirements, will result in repair stations incurring discounted costs of $30.5 million. The most cost-saving requirement, the Manufacturer's Service Manual, will result in repair stations saving between $22.8 and $45.5 million discounted.

The final rule is not expected to have a significant impact on international trade nor is it expected to have a significant impact on a substantial number of small firms.

REGULATORY FLEXIBILITY DETERMINATION

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions.Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605 (b) of the 1980 act provides that the head of the agency may so certify and a RFA is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

In many cases, the Small Business Administration suggests that "small" represents the impacted entities with an annual revenue of $5 million or less. For this final rule, a small entity group is defined as aircraft servicing and repairing, except on a factory basis

(Standard Industrial Classification Code 4581). At present, it is difficult for the FAA to determine exactly how many of these repair stations have an annual revenue of $5 million or less but believes that the number is probably large. The FAA found a minimum of 19 repair stations in the World Aviation Directory that meet this definition[55].

For each of these entities the FAA attempted to find the annual sales from World Aviation Directory 1998, the Net Present Value of Costs, and annualized costs. After calculating the annualized costs accounting for firm size using the same assumptions that were used in the cost section, the FAA then compared the annualized costs with annual sales.

As stated earlier, a minimum of 19 repair stations meet this standard. For the smallest entity listed in Table C1, one company with three employees had sales of $500,000 and another company with 9 employees had sales of $300,000. The annualized cost of the final rule is very small in comparison to annual sales of the affected entities – considerably less than 1 percent of their sales. At most, the final rule will impose an annualized cost on one small entity that is approximately 0.1 percent of its annual sales. Therefore, the FAA does not consider the costs imposed by this final rule to have a significant impact on a substantial number of small entities.

Furthermore, the FAA has rewritten several provisions that provide regulatory flexibility, especially for small entities. Two of these provisions relate to capability lists and repair

[55] World Aviation Directory. Winter 1998 (Valid through March 1999)

station manuals. In addition, one set of provisions on quality assurance has been deleted from the final rule because of the disproportionate impact on small entities. The following discussion addresses each of these three subjects.

Capability list

The final rule allows for use of a capability list. The use of this list provides regulatory flexibility because it provides repair stations with a limited rating the option not having to always change its operations specifications under the existing rule--a repair station that performs maintenance, preventive maintenance or alterations on articles must do so in accordance with its operations specifications. Under the final rule, a repair station with a limited rating may use a capability list, and will no longer have to revise its operations specifications each time a new article is added to the list (however, the final rule retains the requirement that a repair station perform a self-evaluation before adding an article to its capability list).

For example, existing § 145.11(a)(4) requires that an applicant for a propeller rating (class 2) prepares a list of each propeller for which the repair station seeks approval. Revisions to the current list require FAA approval, which makes timely revisions cumbersome in the dynamic maintenance marketing environment.

The FAA believes that these repair stations that choose to use a capability list will incur cost savings. Since the FAA does not know how many repair stations with limited

ratings will choose this option or how frequently they will choose this option, it is not possible at this time to quantify the cost savings.

Repair Station Manuals

Based on FAA statistics and information provided by industry that was used in the preliminary regulatory evaluation, repair stations are estimated to employ approximately 12,877 supervisors and at least 13,444 inspectors. These repair stations must maintain approximately 26,321 IPMs. Because of the complexity of many repair stations' operations, the repair stations should document additional aspects of their operations not covered in the current IPM. Therefore, the FAA will eliminate the requirements that repair stations maintain an IPM and replace it with a requirement that repair stations maintain an acceptable quality control and require the repair station to maintain a repair station manual to document operational procedures. Also, the current requirement for all repair stations' supervisory and inspection personnel to each have a copy of the manual has been withdrawn. In the final rule, only 4,625 repair station manuals will be required to be maintained, so the total number of required manuals will be reduced by 21,696. Final § 145.207 will require only that the repair station manual be accessible for use by repair station personnel. Furthermore, since smaller repair stations do not perform as complex operations as do larger repair stations (due to the number of employees, duties, and responsibilities), the cost for the smaller repair station to revise their IPM and to meet the requirements of final § 145.209 is approximately half that of a larger repair station.

Deletion of Quality Assurance

Proposed § 145.201 required each repair station to establish and maintain a quality assurance system acceptable to the Administrator. The FAA estimated that repair stations were going to incur a total one-time cost of approximately $1,471,400 and annual costs of approximately $12,123,200 on this quality assurance system. Based upon public comments to the docket, this requirement would have had a disproportionate impact on smaller entities. However, for the final rule, the FAA withdrew this requirement and, therefore, no cost will be incurred by these repair stations for the quality assurance system. As stated in the Preamble, the FAA has removed the quality assurance requirements from the final rule and any references to it have been removed from the manual requirements. The FAA intends to issue a subsequent SNPRM that will address this issue.

The FAA has determined that this final rule will not have a significant impact on a substantial number of small entities. Accordingly, pursuant to the Regulatory Flexibility Act, 5 U.S.C. 605 (b), the Federal Aviation Administration certifies that this rule will not have a significant economic impact on a substantial number of small entities.

INTERNATIONAL TRADE IMPACT ANALYSIS

The Trade Agreement Act of 1979 prohibits Federal agencies from engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and where appropriate, that they be the basis for U.S. standards. In addition, consistent with the Administration's belief in the general superiority and desirability of free trade, it is the policy of the Administration to remove or diminish to the extent feasible, barriers to international trade, including both barriers affecting the export of American goods and services to foreign countries and barriers affecting the import of foreign goods and services into the United States.

The final rule is not expected to affect trade opportunities for U.S. firms doing business overseas or for foreign firms doing business in the United States. Furthermore, the final rule is consistent with the terms of several trade agreements to which the United States is a signatory, such as the Trade Agreement Act of 1979 (19 U.S.C. 2501 et seq.), incorporating the Agreement on Trade in Civil Aircraft (31 U.S.T. 619) and the Agreement on Technical Barriers to Trade (Standards) (19 U.S.C. 2531). The revision to part 145 is also consistent with 49 U.S.C. 40105,, formerly 1102 (a) of the Federal Aviation Act of 1958, as amended, which requires the FAA to exercise and perform its powers and duties consistently with any obligation assumed by the United States in any agreement that may be in force between the United States and any foreign country or countries.

UNFUNDED MANDATES REFORM ACT ASSESSMENT

The Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995, is intended, among other things, to curb the practice of imposing unfunded Federal mandates on State, local, and tribal governments. Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in a $100 million or more expenditure (adjusted annually for inflation) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action."

These final rule does not meet the cost thresholds described above. Furthermore, this final rule will not impose a significant cost or uniquely affect small governments. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.